

POPULAR Computing WEEKLY

35p 13 January 1983 Vol 2 No 2

This Week

Oric 1 exclusive

Tony Bridge presents the first review of the Oric 1, a low cost micro to rival the Spectrum and Vic20. See page 12.

Battlestar


Win a ZX Spectrum in this unique play-by-mail, computer moderated game. Full details on page 31.

Dragon diary

Keith and Steven Brain present a diary program for 1983 that you can save on cassette. See page 29.

Spectrum melody

David Lawrence's melody-maker routine enables you to enter, correct and store tunes on the Spectrum. See page 28.



STAR

Animated Engine on BBC model B by Ray Morris. See page 8.

GAME

News Desk

BBC Buggy takes to the floor

THE BBC has unveiled its 'Buggy' robot vehicle designed for use with the BBC Model B microcomputer.

The three-wheeled Buggy is supplied in kit-form and, using only a screw-driver, is easily built into a versatile robot capable of a variety of tasks. The vehicle is about six inches

square and is driven by two 12-volt precision stepper motors.

The simple robot communicates interactively with the BBC computer via a special interface unit supplied with the kit. The Buggy is directed from the computer but the

Continued on page 5



Software plan for Lynx

CAMPUS has set up a software company to provide program support for its Lynx microcomputer.

The new associated company — Camsoft Limited — will both develop software itself and commission material from other software houses.

The first programs released under the Camsoft label — planned for February — will be two educational cassettes to teach spelling and numeracy skills to school children.

Projects under development include a Data File-handling Extension Pack — available on cassette, disc and Rom from mid-1983, a Graphics and Sound Extension Pack and an Advanced Structured Programming Pack.

Camsoft will develop the Lynx disc-operating system, planned for April, and software for Lynx teletext and Micronet 800 compatibility.

A Camsoft spokesman explained that the first independent software house to write material for the Lynx will be Softek.

Classified

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16K RAM CARTRIDGE for Vic20, price negotiable. Tel: 01-961 7158 (evenings).

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VIC20. six months old + cassette, Adventure Land cartridge + others + about 12 cassettes, £120. Tel: Marshalls Cross, St. Helens 816651.

VIC20 + cassette unit. one Adventure cartridge, four games, two books, £150. Tel: Johnstone 23831 (Scotland).

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DRAGON 32. 3 months old, boxed, including all cables and leads, cassette recorder, pair of joysticks, £110 of software, £225.00. Tel: Preston, Lancashire 323148.

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Continued on page 32



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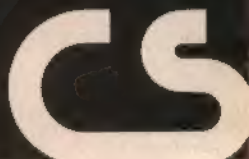
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Accuracy

Popular Computing Weekly cannot accept any
responsibility for any errors in programs we
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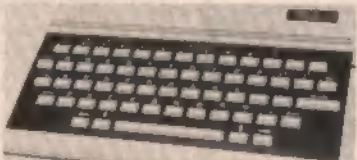
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Editorial

The US market for microcomputers
has grown from almost nothing in
1975, when Steve Wozniak founded
Apple in a garage in California, to an
estimated \$4,500m today. By 1987
this market, which covers micros that
cost anywhere between \$100 and
\$10,000, could be worth as much as
\$18,500m.

There are now approximately 150
different microcomputer manufactur-
ers in the US. This compares with less
than 50 just 18 months previously.

Sinclair, through its links with
Timex, has already made inroads into
the US market. The Timex/Sinclair
1000, a 2K version of the ZX81, has
sold in large quantities since its launch
in September last year. Further Timex/
Sinclair machines are expected shortly.

Acorn also plans to sell its range of
BBC micros in the US, starting in the
first quarter of this year (*Popular Com-
puting Weekly*, November 4).

Leading software companies such
as Artic, Quicksilver and Bug-Byte,
have also made arrangements to dis-
tribute their wares in the US.

This is a trend to be encouraged,
though companies should beware of
overreaching themselves. Exporting
British micros, or arranging to have
them built under licence, can only
create new outlets for British software.

Next Thursday

Shahid Butt presents *Flipside*, a new
type of game for the Vic20. Can you
control the continuously moving ball
and guide it round the screen within the
time limit?

Also next week, John White looks at
the history of micro chess.

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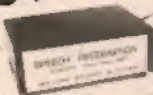
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Buggy fun

Continued from page 1

commands depend on information fed back from sensors on the Buggy.

A bumper at the front, split into two parts, can detect an obstruction to the left or right. Also at the front, a Light Dependent Resistor (LDR) can sense if the Buggy is near a light source. Underneath, an infra-red transceiver can follow a line on the floor or read information from special bar-codes. There is also provision for additional sensors such as a pen or robot arm.

Software supplied with the Buggy includes thirteen programs: *Test* checks that it is correctly set up; *Switch* demonstrates the main commands which drive it; *Memory Switch* stores the path selected manually from the computer; *Snail* allows a route to be planned from the screen; *Route Planner* is a more advanced version of *Snail*; *Bar-Code Route Planner* reads route instructions from special cards; *Explore For Object* searches for obstacles and determines their shape; *Explore For Walls* maps boundaries; *Sunseeker* finds a light source; *Man Versus Buggy* allows 'blind' navigation using only information fed back from the Buggy; *Line Follower* traces a black or white line; and *Tin Pan Alley* reads bar-codes as musical tones.

The Buggy has been developed by MEP and Economics in conjunction with the BBC. It makes an appearance in Programme 8 of the new BBC tv computer series, *Making the Most of Your Micro*.

Next year the BBC plans a whole series devoted to control applications in which the Buggy will be used. Accompanying the Control tv series will be an NEC Control Technology Teaching Course and an NEC Teaching Board. This hardware board will connect to the Buggy's interface card.

Manufactured by Econometrics, the Buggy will be available in March. The kit plus leads, interface, software and instruction booklet is expected to cost around £120 plus VAT. A power supply will be provided as an extra, but the Buggy will operate from the disc-drive power supply on the BBC micro.

Acorn display range of second processors

ACORN Computers demonstrated some of the exciting new peripherals for the BBC micro at a special BBC Computer Exhibition held at the World Trade Centre, London, from January 5 to 7.

The show gave the BBC and Acorn a world first — a public demonstration of telesoftware. Using a BBC micro fitted with Acorn Teletext Adaptor, broadcast software was downloaded to the computer from special pages held on Ceefax (Pages 700-705). The Teletext Adaptor is planned for sale in March.

Also on display was Acorn's impressive range of second

processors for the BBC Model B microcomputer. There is now a choice of three units — a 6502-based unit with 64K Ram, a Z80-based unit with 64K Ram and a 16032-based unit with 128K Ram.

The Z80 processor gives the BBC machine an entry into the wide range of Z80 software — especially that operating under the CP/M system.

The 16032 second processor is particularly interesting since this fast National Semiconductor chip has full 32-bit architecture and provides 16-bit output. At present the unit incorporates 128K Ram, but by using 128K DRams expan-

sion to 1M Ram will be possible. The National Semiconductor 16081 Floating-point Unit will be compatible with the 16032 second processor.

All three second processor units connect to the BBC micro through a special high-speed data transfer interface chip — the 'Tube'. The three processor units will be available as soon as final production of the Tube chips is completed — possibly in late March.

The Z80 of 6502 second processor plus Tube interface, Rom for the Tube operating system, connectors and 64K Ram will cost £195 plus VAT. The price of the 16032 package has not been finalised but it is expected to be around £600. Acorn's Herman Hauser commented "At that price the unit is by far the least expensive 32-bit processor in the world".

Orbis — a subsidiary of Acorn, also present at the show — demonstrated the prototype of a system to link the BBC micro to a video disc. The computer, connected to a Pioneer Laser Disk System, controlled test prompts from the computer's monitor in tandem with the video picture from the laser disc system.

Sinclair private share placement is on the cards

SINCLAIR Research has set in motion a plan to place a 10 percent share of the company with city institutions.

The advantages of investment in the company were explained at a meeting last week between Clive Sinclair and selected institutions held at the offices of N M Rothschild, merchant bankers.

The 10 percent share — part of Clive Sinclair's 95 percent share — has been valued

at as much as £20m, making the company as a whole worth £200m.

Part of the capital raised by the sale will be used to continue funding development of an electric car. This project is a separate development financed by Clive Sinclair and is not part of Sinclair Research.

Pre-tax profits of Sinclair Research last year amounted to £10m on a £27m turnover. Profits this year could reach £50m.

Micro grants to train teachers

THE Department of Industry has announced a £1m scheme to give teacher training colleges micros.

In order that best use can be made of the computers introduced into schools under the existing Department of Industry Micros in Primaries and Secondaries Schemes, the same range of equipment is now being offered to help teach the teachers.

Under this latest grants plan

Swansea show

SWANSEA Computer 'Show' will be held at the Swansea Leisure Centre, Oystermouth Road, from January 13 to 15. Entry is free and the show is open from 12 am to 9 pm on Thursday, 9 am to 9 pm on Friday and 9 am to 4 pm on Saturday.

more than 100 teacher training establishments will receive a Research Machines 480Z, Acorn BBC Model B or Sinclair Spectrum package.

Colleges will also be invited to claim further funds of up to £15,000 per college with which to purchase software and peripheral devices.

Taking on board the Inca Curse

SINCLAIR Research continues its policy of taking the best of the independently produced software under its own wing.

Latest additions to the Sinclair approved list include: Melbourne House's *Hobbit*, and Artic's four adventures *Planet of Death*, *Inca Curse*, *Ship of Doom* and *Espionage Island*.

The *Hobbit* is available for the Spectrum. The *Artic* tapes have both Spectrum and ZX81 versions.



Vic Interface cartridge

DAMS Business Computers has produced a Vic 1EEE interface cartridge for the Vic20 microcomputer.

The cartridge plugs into the back of the Vic20 and enables disc drives, printers and other peripherals to be connected. It also allows more than one computer to use the same disc drive.

The Dams Vic 1EEE interface is priced at £49.95 plus VAT, available from Dams Business Computers, Gores Road, Kirby Industrial Estate, Liverpool.

A version for the Commodore 64 machine is also planned.

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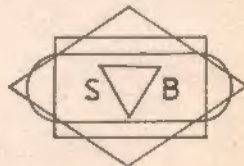
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Essential changes

Despite assurances in *Popular Computing Weekly* and other magazines that ZX81 programs containing no *Peek* or *Poke* statements can be entered directly into the Spectrum, I found that even then certain detailed changes and considerations are essential.

Firstly, while *Fast* and *Slow* can be ignored as far as input is concerned, one must look for *For/Next* loops used as delay timings when the ZX81 is operating in *Slow* mode. The Spectrum loop must be made about four times longer to give the same delay.

Secondly, lines using *Code* or *Chr\$* must be converted to take account of the significant differences in coding of the two machines. Spectrum 0-9 digit codes are 48-57 compared with 28-37 on the ZX81 and capital letters A-Z are 65 to 90 on the Spectrum but 38-63 on the ZX81.

There is no simple or logical relationship between the two sets of codes, so changes must be on a case-by-case basis (see list). It should also be noted that variables may often define *Codes*, and these need changing as well.

Finally, *Scroll* needs to be induced in some cases.

The advice you gave in *Peek* and *Poke* in the December 16/23 issue was therefore both inadequate and incorrect. I hope Mr Ames has not sold his

Spectrum as a result of the advice given.

ZX81	SPECTRUM
0	32
1	138
2	129
3	131
4	136
5	138
6	132
8-10	need <i>Usr</i> definition
11	34
12	96
13	36
14	58
15	63
16-17	40-41
18	62
19-20	60-61
21	43
22	45
23	42
24	47
25	59
26	44
27	46
28-37	48-57
38-63	65-90
64-66	165-167
112	11
113	10
114-115	8-9
116	N/A
117	7
118	(137)
119	12
120-121	N/A
126-127	N/A
128	143
129	141
130	142
131	140
132	135
133-134	133-134
135	139
136-138	need <i>Usr</i> definition
139-191	N/A (inverse characters)
192	N/A
193-194	22-23
195-211	175-190
212-215	182-185
216	94
217-221	197-201
222-224	203-205
226-227	224-226
228-229	N/A
230	230

231 N/A
232-251 232-251
252 N/A
253-255 253-255

Unused ZX81 codes are not listed. The ZX81 uses some 'hatched' graphics which are not available in Spectrum graphics, but can be added to the user-definable graphics set and the code change will be defined by the *Usr* key employed.

NNS Waller
20 South Park Gardens
Berkhamsted
Herts HP4 1HZ

Missing printed circuit connection

Like many others I have bought an Amber 2400 printer for my early model A BBC computer, only to find that the buffer was failing to give up its secrets into the printer on demand.

All thanks must go to Dave Rainer, the Sherlock Holmes of Amber Printers of Andover, who solved the problem by deducing that there appears to be no printed circuit connection on the number 19 hole of the 26 din socket.

If this can happen to the Amber printer, then one must suppose that it can happen with other printers also. I would like to thank those concerned at Amber for all their help and hope that this gives the green light to other early BBC micros with the same problem.

Victor Spink
Flat 1
The Cedars
Windsor Street
Chertsey
Surrey

Deliberate error messages

Only one of the five "bugs" referred to by Colin McCormick in *Popular Computing Weekly*, December 16, is really a bug. The Vic20 fails to generate a "File not found" after reading an end-of-tape marker, instead it produces a "Device not present" error. It does not cause any problems, other than a bit of confusion.

However, the other "bugs" referred to are actually deliberate error messages. You cannot *Load*, *Save* or *Verify* to device 2 (RS232)

because the inclusion of ASCII control characters could cause problems with most RS232 devices. Hence the "Illegal device number".

Opening more than 10 files produces a "Too many files" error due to the limited space available for storing the file parameters. In practice this is not a worry since, having more than two or three files open simultaneously is a rare occurrence.

Using device 0 is similar to using the keyboard, but it is treated as an external device. If you use *Input #* and try to read non-numeric characters into a numeric variable, the Vic will respond with "File data error" regardless of which device you use. This is the file equivalent of the "Redo from start" error message.

If you *Load*, *Save* or *Verify* to any device other than cassette, a filename must be provided since this is often an intrinsic requirement of the external device (for instance, the disc drive). So, no filename will produce "Missing filename".

Mike Todd
Independent Commodore
Products User Group
27 Nursery Gardens
Lodgefield
Welwyn Garden City
Hertfordshire AL7 1SF

A shorter and easier method

RE Screen\$ on ZX81, *Popular Computing Weekly*, November 11, by Bill Henderson. A shorter, easier to use, method is:

PRINT AT Y, X: move cursor to required X, Y co-ordinates on screen
C=PEEK(PEEK 16398+256*PEEK 16399): peek position of cursor
PRINT: cancel effect of above semi-colon.

C now holds the code of the character at 'Screen\$ (Y,X)'.
Kenneth Taylor
5 Hexham Close
Moorhouses Est
North Shields
Tyne and Wear
NE29 8BJ

If you have an opinion you want to express, or have spotted an error that needs correcting, write to: Letters, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2.

Speeding up the Dragon

In Vol 1 No 35 there was a letter from Mr D Smith, on changing the speed of the Dragon 32, with *Poke* 65495, 0. This can be reset by using *Poke* 65494, 0.

Both of these addresses access the SAM chip (see table below). Just two bits control the rate and these are normally 0, as shown here. The above *Pokes* set and clear the lower bit.

The upper bit can also be set by *Poke* 65497, 0 either

together with the lower bit, or by itself. This gives an even greater speed increase, but scrambles the usual output until this bit is cleared with *Poke* 65496.

I hope that this is of some use and that you continue to publish information on the Dragon.

Eric Cottam
36 Chyandor Close
Middleway
Par
Cornwall

ADDRESS				
DEC	HEX			
65497	FFD9	SET		
65496	FFD8	CLEAR	0	MPU
65495	FFD7	SET	0	RATE
65494	FFD6	CLEAR		

Animated Engine

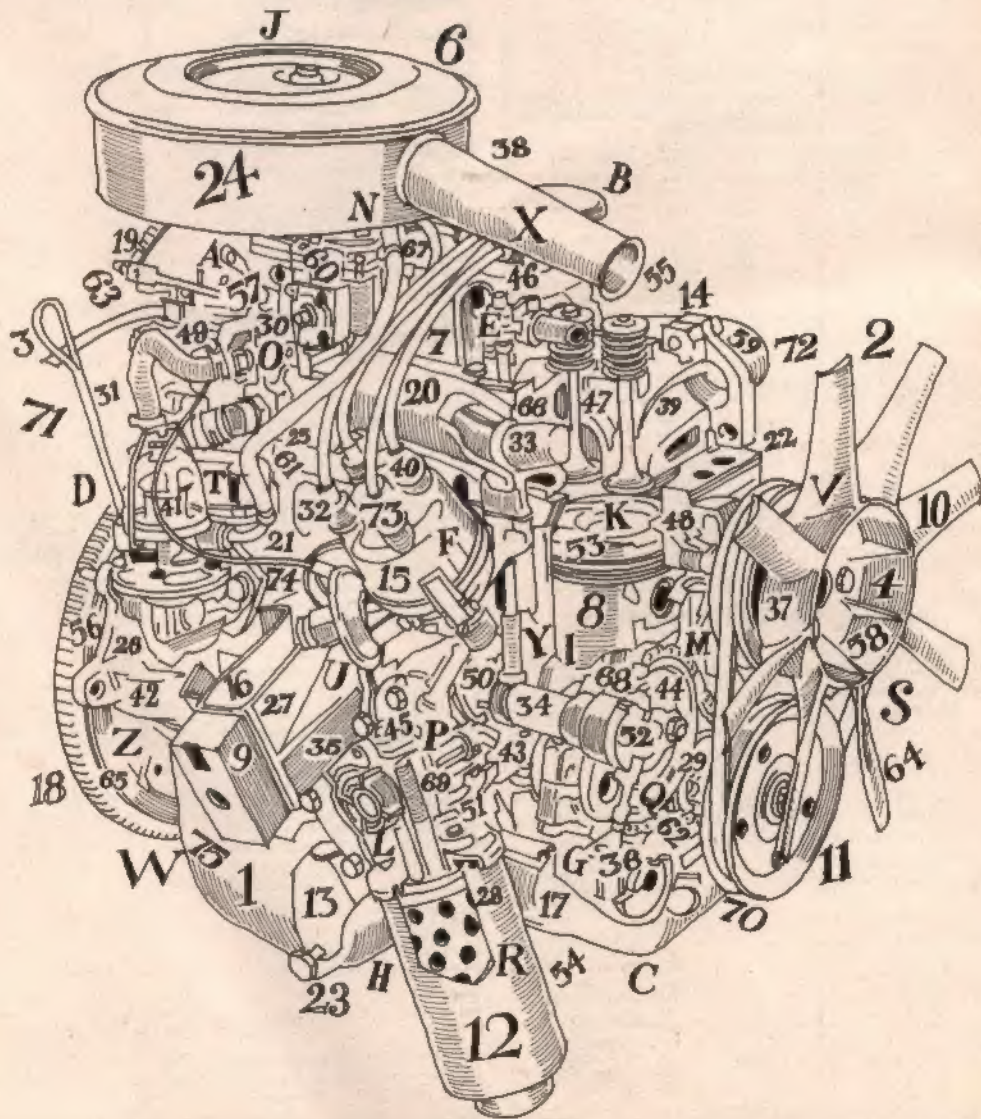
A new game for BBC model B by Ray Morris

This program draws an animated diagram of the workings of a four-stroke petrol engine. As the piston moves up and down in the cylinder, the crank rotates, the valves open and close and the spark plug fires.

The program is written as a series of procedures which plot the engine outline and move the piston and valves. The procedures are called in a repeat loop to illustrate the four strokes of the engine cycle.

Lines are plotted using a plot 5 command and rubbed out using a plot 7 command. The speed of the engine is changed by the value of S, the step size in the For Next loop which plots the piston movement. Labels are rubbed out by reprinting in the background colour.

The program is 2.2K long and runs on a BBC model B. It could be modified to run in mode 5 on a model A machine if the labels were repositioned to allow for the larger character size.



```

>L,50
L
10 REM ENGINE by Ray Morris
20 MODE 1
30 ON ERROR GOTO 00
40 VDU19,0,4,0,0,0
50 VDU19,3,6,0,0,0
50 GCOL0,128:GCOL0,2
70 VDUS
80 CLG
90 MOVE200,1000:PRINT"4 - STROKE PETROL ENGINE"
100 PROCBLOCK
110 PROCVALVE(415,700,5):PROCVALVE(585,700,5)
120 MOVE100,55:INPUT"SPEED - 5 TO 150 "S
130 REPEAT
140 GCOL0,2
150 PROCVALVE(415,700,7)
160 PROCVALVE(415,600,5)
170 GCOL0,3:MOVE150,770:PRINT"In >"
180 GCOL0,0:MOVE800,600:PRINT"EXHAUST"GCOL0,2:MOVE800,600:
PRINT"INTAKE"PROCDOWN
190 PROCVALVE(415,600,7)
200 PROCVALVE(415,700,5)
210 GCOL0,0:MOVE150,770:PRINT"In >"
220 GCOL0,0:MOVE800,600:PRINT"INTAKE"GCOL0,2:MOVE800,600:
PRINT"COMPRESSION"
230 PROCUP
240 GCOL0,1:PROCSPARK,GCOL0,2
250 GCOL0,0:MOVE800,600:PRINT"COMPRESSION"GCOL0,2:
MOVE800,600:PRINT"IGNITION"
260 PROCDOWN:GCOL0,0:PROCSPARK,GCOL0,2
270 PROCVALVE(585,700,7)
280 PROCVALVE(585,600,5)
290 GCOL0,1:MOVE750,770:PRINT"Out >"
300 GCOL0,0:MOVE800,600:PRINT"IGNITION"GCOL0,2:
MOVE800,600:PRINT"EXHAUST"
310 PROCUP
320 PROCVALVE(585,600,7)
330 PROCVALVE(585,700,5)
340 GCOL0,0:MOVE750,770:PRINT"Out >"
350 UNTIL 0
360 REM*****
370 DEF PROBLOCK
380 FOR I = 1 TO 34
390 READ M,X,Y:PLTM,X,Y
400 NEXT
410 DATA 4,250,700,5,375,700,5,375,450
420 DATA 5,250,300,5,250,110,5,280,100
430 DATA 5,740,100,5,750,110,5,750,300
440 DATA 5,625,450,5,625,700,5,750,700
450 DATA 4,250,800,5,375,800,5,435,760
460 DATA 5,445,730,5,455,700,5,545,700
470 DATA 5,555,730,5,565,700,5,625,800
480 DATA 5,750,800,4,490,700,5,490,710
490 DATA 5,510,710,5,510,700,4,495,700
500 DATA 5,495,695,5,505,695,5,505,700
510 DATA 4,495,710,5,495,750,5,502,750
520 DATA 5,585,710
530 ENDPROC
540 REM*****
550 DEF PROCUP
560 A = 270:B = 360:300 + S
570 FOR X = 0 TO 150 STEP S
580 PLOT4,377,450 + X:PLOT5,623,450 + X
590 PLOT4,377,520 + X:PLOT5,623,520 + X
600 PLOT4,500,250
610 PLOT5,COS(RAD(A)) + 100 + 500,SIN(RAD(A)) + 100 + 250
620 PLOT5,500,450 + X
630 PLOT4,500,250
640 PLOT7,COS(RAD(A)) + 100 + 500,SIN(RAD(A)) + 100 + 250
650 PLOT7,500,450 + X
660 PLOT4,377,450 + X:PLOT7,623,450 + X
670 PLOT4,377,520 + X:PLOT7,623,520 + X
680 A = A + B:NEXT
690 ENDPROC
700 REM*****
710 DEF PROCDOWN
720 A = 90:B = 360:300 + S
730 FOR X = 150 TO 0 STEP -S
740 PLOT4,377,450 + X:PLOT5,623,450 + X
750 PLOT4,377,520 + X:PLOT5,623,520 + X
760 PLOT4,500,250
770 PLOT5,COS(RAD(A)) + 100 + 500,SIN(RAD(A)) + 100 + 250
780 PLOT5,500,450 + X
790 PLOT4,500,250
800 PLOT7,COS(RAD(A)) + 100 + 500,SIN(RAD(A)) + 100 + 250
810 PLOT7,500,450 + X:PLOT7,500,250
820 PLOT4,377,450 + X:PLOT7,623,450 + X
830 PLOT4,377,520 + X:PLOT7,623,520 + X
840 A = A + B:NEXT
850 ENDPROC
860 REM*****
870 DEF PROCVALVE(V,W,D)
880 PLOT4,V - 38,W:PLOT0,V + 38,W
890 PLOT4,V,W:PLOT0,V,W + 150
900 REM*****
910 ENDPROC
920 DEF PROCSPARK
930 MOVE485,695:PRINT"-"
940 ENDPROC

```

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Christmas brings brisk business ■ the micro scene.

Micros are in town

David Kelly scours the shops in search of micros with surprising results.

Looking back over 1982, one of the significant changes — as far as microcomputers were concerned — was the way that the machines became available in local high-street shops.

Manufacturers now reckon that distribution through some high-street outlet is essential. Machines must be available through stores such as Dixons, Boots, Laskys and W H Smith.

The past few months have seen the example set by Commodore's Vic20 machine copied many times. The Vic20 was the first microcomputer to be prominently displayed in the windows of chain stores up and down the country. The Sinclair ZX81 followed in branches of W H



Smith. Now both of these machines can be bought in almost any shopping street, anywhere in the country.

Recently, the Atari 400-800 has popped up all over the place. The Computers Lynx is now to be found in Dixons, Laskys and Spectrum stores. The NewBrain is in Laskys, as is the Jupiter Ace. And only a few weeks ago the Sinclair Spectrum made its retail debut in selected branches of W H Smith.

The Dragon 32 has been very successful, with retail outlets including Boots, Dixons, Laskys and Debenhams. The Commodore 64 has also found a home in Dixons and Laskys.

But for all this emphasis on retail outlets, a number of *Popular Computing Weekly* readers still complain that they are unable to buy the micros of their choice over the counter. So, we conducted our own survey of high-street stores in London to find out

which micros were actually in stock before Christmas.

The results were not altogether surprising. Many stores had either sold out of, or not received, their range of home micros. This was largely due to the Christmas boom in demand for micros which caught many manufacturers unawares.

The only micros available in anything like reasonable quantities at a variety of outlets were the Atari 400 and 800 machines. The only reason they remained unsold appears to be their price — at £199 and £349 they seem expensive — and their image. The sales assistant in John Lewis's in Oxford Street explained to one customer: "If you want a games machine then I would recommend the Atari. But if you want a computer then the Vic20 is a computer that plays games at a much cheaper price."

The Dragon 32 was nowhere in evidence. For some weeks prior to Christmas the Dragon 32 machine had been in short supply — by the week before Christmas it was more or less unobtainable.

This unfortunate state of affairs was entirely due to the comparatively small manufacturing capacity of the Dragon Data operation. The company can only produce somewhere in the region of 3,000 machines per week and will only be able to expand when it moves to new premises early in the new year. This production shortfall must surely have lost Dragon many sales in the pre-Christmas period.

As the first micro into the high-street, the Vic20 should have been in plentiful supply. But very few shops had supplies of Vic20s for sale near Christmas. Ian Williams, Dixon's Microbuyer said: "It has been totally amazing. As fast as we can get the Vic20s they are being sold."



The manager of the microcomputer section in Debenhams had almost sold out of any sort of machine: "I had 22 Vics left at the start of the morning and five have gone already. I don't expect they will last the day," he said. "It has been very hectic. I have one Atari 800 and 12 ZX81s remaining and that's the lot."

Debenhams were selling the Vic20 for £129.95 and one specialist shop in Regent Street was offering it for £125. But most of the other shops — including John Lewis



and Dixons in Oxford Street and one of the branches of Laskys in Tottenham Court Road — had no Vic20s for sale. The main Laskys branch, with a special microcomputer section, had a few Vic20s but could not supply the cassette player unit for the machine. (Unlike some other machines, the Vic20 requires a dedicated cassette unit.)

The greatest selection of micros was to be found in the big Laskys store. Over the last year the company has expanded its range of micros considerably. Here, the Atari 400 and 800, Vic20, Jupiter Ace, and Grundy NewBrain were all on show. There was even an Osborne 1.



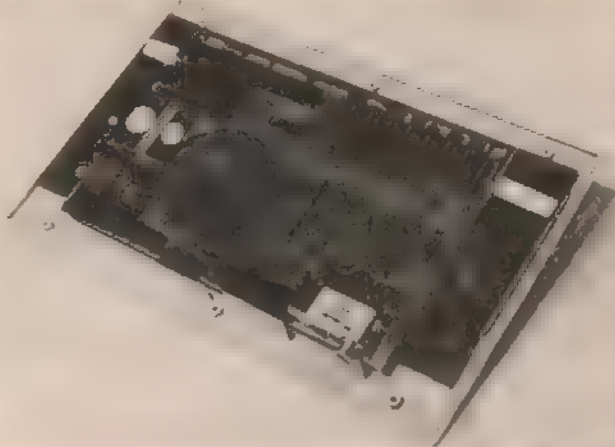
In none of the shops visited was there any sign of the Computers Lynx, the Commodore 64 or the Oric 1. But Laskys were taking orders for the Lynx, to be delivered in January, and offered to reserve a Commodore 64 for a deposit of £33.

Ironically, considering its past record, the only machine available in any real quantities, apart from the ZX81, was the Sinclair Spectrum. This machine went on sale in some 70 top W H Smith stores at the beginning of December.

At Smith's in Oxford Street a special section of the shop — called Electronics World — is devoted entirely to microcomputing. A sales assistant had only one word to describe how things were going — "Tremendous".

"We have about 300 16K and 48K Spectrums in stock at the moment," he said. "When we started this morning the shelves were full. We have had to fill them up three times already so far today."

"We seem to sell more of the 48K machine, mainly I think because people are worried that it will be difficult to get their 16K machines up-graded. On the other hand the ZX81 sales are much slower — they still go but we haven't sold very many since we began to stock the Spectrum."



Inside the Oric, showing the pcb, loudspeaker, modulator and cpu.

Oric 1—not just a Tangerine dream

Tony Bridge presents an exclusive review of the Oric 1, the first colour micro to cost less than £100.

Onto the battlefield ■ the home/hobby computer comes the latest contender for your money, the Oric 1. Oric, financed by British Car Auctions, commissioned Tangerine, long well-thought ■ for the MicroTan computer, to design their first machine.

A large box contains the computer, manual, power supply and introductory tape. Unfortunately, there is no cassette-to-computer lead, so be warned — you will need a lead with a 5- or 3-pin Din plug on one end and either a Din plug or 3.5mm jack plug ■ the other end, depending on what sockets your cassette machine provides.

The keyboard is the most distinctive feature of the package, consisting of 57 unusually-shaped keys. While they certainly make for an eye-catching keyboard, touch-typists will need a little time to get used to them. However, the keys feel like real keys, with positive feedback, unlike some of the rubbery keypads on other microcomputers.

Both upper and lower case are available and all keys have auto-repeat. There is a standard Qwerty layout with *Esc*, *Ctrl*, *Del* and *Return* keys, cursor control keys and a large space bar.

An audible *Beep*, lower-pitched in the case of the *Return* key, ■ a reminder of correct contact. This can become rather annoying (to other members of the family,

if not yourself), but ■ easily switched off by pressing *Ctrl* and the *F* key.

At the back of the case are all the connections for tv, cassette machine and power, together with an expansion port for future Ram updates, and the Centronics interface (unusual, even unique, for a machine of this price) for a printer, joysticks and the Communications Modem, when it becomes available. There is also a *Reset* button hidden away beneath the computer, so that you may get out of an endless loop without switching off and thus losing the whole program.

Based on the 6502A microprocessor, the Oric is 52mm high, 280mm wide, 175mm deep and weighs 1.1kg. It has 16K Ram which contains the Basic interpreter and operating system. Two versions of the Oric are available — a 16K Ram machine which costs £99.95 (including VAT) and a 48K machine which costs £169.95 (including VAT).

The 48K model actually possesses 64K Ram, but 16K ■ overwritten by the Rom. However, external control lines can enable you to use the full 64K of Ram. Alternatively, the control lines can be used to expand the Rom externally.

The cassette interface operates at either 300 baud or 2400 baud. A Schmitt trigger circuit cuts down extraneous noise.

The machine supplied for review had a problem with the modulator which caused the tv to lock onto the wrong signal. This prevented the micro from working properly with the Sony Trinitron, Sony 12in portable, NEC and Hitachi tvs, though it was linked successfully to a Ferguson TX tv.

However, Oric claims to have overcome

this problem by changing three of the resistors in the modulator. Nevertheless, it would be a sensible precaution to check that the Oric works on your tv before buying.

The Basic ■ an extended form of Microsoft, and really holds no surprises. It supports full string-handling with *LEFTS*, *RIGHTS* and *MID\$* commands. *Data*, *Read* and *Restore* are also included in Oric's form of Microsoft and all the usual *Goto's*, *Gosub's* and loops may be implemented. A revised form of the Rom, will also, apparently, include *If - Then - Else*.

The manual takes you through the elementary stages of using Oric Basic, telling you what *Print* means, how to use *For - Next* loops and so on. Information is slightly difficult to find in the manual, as there is no index or chapter-by-chapter breakdown of the various commands. However, this edition of the manual is only temporary, as Oric themselves admit, and will be replaced by a more comprehensive write-up. The final edition should be worth waiting for — how many manuals, after all, contain old Chinese proverbs, as this one does?

I found typing in listings to ■ straightforward, although rather tedious after a Sinclair — no one-touch keywords here, and also, unfortunately, no syntax-checking on entry. Thus the program has to be Run before a typing error is found. On Listing, full indentation of lines is carried out, making a neat job of your haphazard spacing.

Error codes, though, were extremely



useful ■ hunting down mistakes in the programs, with particularly good on-screen explanations. There was no Editor in the review model, but this should be a standard feature in the production machine.

There are two modes available to you when programming. *Text*, as its name suggests, is the one you will use to write text to the screen, either directly or from

within a program, and is the mode automatically selected by the Oric on power-up. *Hires* is the mode in which the computer draws high-resolution pictures, again under direct command or from within a program. Three lines at the bottom of the screen contain your Basic commands, so that you can see the results of your instructions.

Colours may, of course, be used in either mode. There are eight colours, including black and white, and they may be assigned, via *Ink* and *Paper* commands, to foreground or background respectively. Incidentally, do not be fooled by Oric's claims for 16 colours — they are counting both back- and fore-ground colours.

In the *Hires* mode, the display consists of 240 x 200 pixels (in *Text* mode, the display contains 28 rows of 40 characters each). Several commands are available for drawing. *Cursel* sets the cursor at a desired point on the screen — the command must be followed by three parameters: X, Y and FB, where FB is the



Tony Bridge reviews the Oric 1.

characters on the Oric, so *Space Invaders* with Greek and Russian instructions now becomes possible!

The sound commands on the Oric 1 are, for a computer at this price, very sophisticated. Three music channels, and one noise channel, mean that you can program some fairly complex sounds. Six octaves are available, and any or all of the three music channels are capable of being mixed with the noise channel, and each other. There are also seven envelope shapes. All this may sound quite complicated, but in practice is fairly straightforward.

Games-players may use the noise channel, together with the seven envelope modes, to produce their own annihilation sounds. But the Oric 1 kindly provides four predefined sounds to use within arcade games: *Zap*, *Ping*, *Shoot* and *Explode* — fairly self-explanatory, I think! The first two are successful, but the latter two sound a little tired, with a small hiccup at the end of the effect. However, they are very convenient to use, being called in a program merely by their name.

Summary

Who is the Oric 1 being aimed at? The ardent games player, the most likely purchaser at this end of the market, will no doubt be pleased with the graphic and sound capabilities of this microcomputer. These are surely a match for machines

costing much more.

Oric Products themselves devote a lot of space in their advertisements to highlighting the advantages of the machine for the business user. They emphasise the availability of their modem, and promise (no date mentioned, however) microdrive discs and a speed printer.

The modem is certainly unusual in a machine of this price. Together with the other peripherals, when finally available, it should make for an attractive package for a small business. Anything larger than a very small business, however, would surely be looking at larger and more flexible systems than this.

The common factor for acceptance of any machine by both games-players and businessmen must be software. Any new machine will stand or fall with its supporting programs, however good its initial specifications.

Tangerine is working on an extended version of Basic, to be released soon. Also on the stocks are *Zodiac*, an adventure game, and a data management package. A multi-games cassette, containing standard programs such as *Lunar Lander* and *Noughts and Crosses*, is also due for release.

With independent software producers such as Bug-Byte also planning to write programs for the Oric, it seems certain to capture a slice of the market. ■

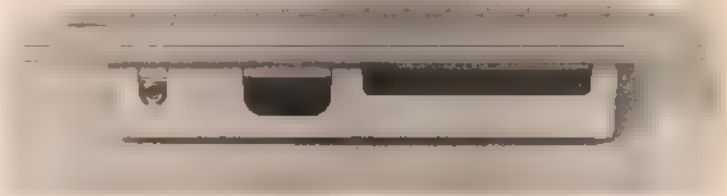


foreground/background colour. *Cumov*, similarly followed by the three parameters, sets the cursor to a point relative to the last plotted position. *Draw*, with the three codes again, will draw a straight line from the current cursor position plus X and Y.

Finally, also for line drawing, *Pattern* — a rather unusual command (unique, I think) that will impose a binary 'mask' on to the straight line. This works by taking the binary code of a number and breaking up the solid line into a series of dots, dashes and so on, as each pixel is 'switched' on or off. So, for power-up, the number 255, binary code 11111111, is loaded into the pattern mask, thus giving a solid line. The number 1, after the *Pattern* command, would give the code 00000001, or a dot every eighth pixel. The number 15, code 00001111, would give equal-sized dashes along the length of the line.

The *Circle* command is fairly self-explanatory. The cursor is first set, then a circle of the given radius, and colour, is drawn, with the cursor at centre. *Point* is a very useful command, which returns the colour of a particular pixel and checks to see if it is in the background or foreground colour. You will need this to check the position of your *Space Invaders*! The final command to be used with the graphics is *Fill*, which fills a given area with a colour or pattern.

You may define up to 96 of your own



Rear view of the Oric showing, from left to right, TV socket, RGB socket, cassette socket, Centronics printer interface, expansion port and power (9VDC) socket.

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Graphics

on Spectrum

Uncle Clive has provided us with a very useful circle drawing command on his Spectrum, but there is no provision for triangles, squares, pentagons and so on. Why? Because it is incredibly simple to draw these shapes perfectly, using only a three-line subroutine.

Look at the routine in the listing. You can see three variables need to be set up before calling this subroutine. These are:

1. **SIDES** — This is, as it suggests, the number of sides that the shape has, e.g., LET SIDES = 5 would give you a pentagon on calling the subroutine.
2. **LENGTH** — Again, this explains itself. It is the length (in single pixels) of each side of the shape, e.g., LET LENGTH = 20, gives sides of length 20.
3. **ANGLE** — This is the angle between the first side of the shape and the horizontal (in Radians), e.g., LET ANGLE = PI/6, gives a tilt of 30 degrees.

Graphics subroutine

```

990 REM GRAPHICS SUBROUTINE
1000 FOR s=0 TO 2*PI-.1 STEP 2*PI
1010 REM draws a straight line
1020 length=10
1030 REM calculates angle to
1040 draw line, and draw
1050 NEXT s
1060 RETURN
    
```

```

1000 FOR s=0 TO 2*PI-.1 STEP 2*PI
1010 DRAW length*COs (angle+s),
1020 length*SiN (angle+s)
1030 NEXT s
1040 RETURN
1050 REM DATA FOR SHAPES
1060 REM COLOURS ARE $125.
1070 DATA 7.5, 2*PI/3, .55
1080 DATA 2.0, PI/3, .40
1090 DATA 4.0, PI/6, .25
1100 DATA 6.0, PI/6, .50
1110 DATA 8.0, PI/6, .75
1120 DATA 3.4, PI/6, .85
1130 REM SAME DATA BUT
1140 REM CENTRE MOVED ABOUT.
1150 DATA 7.5, 2*PI/3, .55, -25
1160 DATA 2.0, PI/3, .40, -25
1170 DATA 4.0, PI/6, .25, -25
1180 DATA 6.0, PI/6, .50, -25
1190 DATA 8.0, PI/6, .75, -25
1200 DATA 3.4, PI/6, .85, -35
    
```

Program 2



```

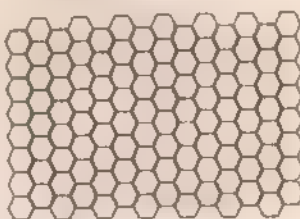
5 BORDER 0: PAPER 0: INK 0: C
10 LET sides=5
10 FOR h=0 TO 100 STEP 10
20 PLOT h/2+50, h*COs PI/3: LET
length=110-h: LET angle=h/200
30 GO SUB 1000
40 NEXT h
50 STOP
990 REM GRAPHICS SUBROUTINE
1000 FOR s=0 TO 2*PI-.1 STEP 2*PI
1010 DRAW length*COs (angle+s),
length*SiN (angle+s)
1020 NEXT s
1030 RETURN
    
```

Program 3

```

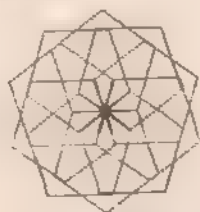
5 BORDER 0: PAPER 0: CLS
10 FOR n=1 TO 6: LET angle=0:
READ int, sides, step, length
20 INK int: CLS
30 PLOT 150, 57: GO SUB 1000
40 LET angle=angle+step
50 IF angle>2*PI THEN GO TO 30
60 PAUSE 150: NEXT n
70 RESTORE 1000
80 FOR n=3 TO 8: LET angle=0:
READ int, sides, step, length, centr
90 INK int: CLS
100 PLOT 125+centr*COs angle, 7+centr*SiN angle: GO SUB 1000
110 LET angle=angle+step
120 IF angle>2*PI THEN GO TO 100
130 PAUSE 150: NEXT n
140 RUN
990 REM GRAPHICS SUBROUTINE
    
```

Honeycomb



```

1 REM HONEYCOMB
10 BORDER 0: PAPER 0: INK 0: B
15 LET sides=6: LET length=10
20 LET angle=0
20 FOR h=10 TO 230 STEP 32
30 FOR s=10 TO 150 STEP 16
40 PLOT h/2, GO SUB 1000
50 PLOT h/2, GO SUB 1000
60 NEXT s
70 STOP
990 REM GRAPHICS SUBROUTINE
1000 FOR s=0 TO 2*PI-.1 STEP 2*PI
1010 DRAW length*COs (angle+s),
length*SiN (angle+s)
1020 NEXT s
1030 RETURN
    
```

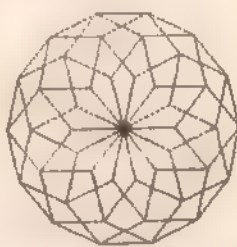


Graphics
by Bill Langley

Once these three variables are set, GOSUB 1000 draws the shape at the cursor position.

There are three demonstration programs for you to try. First, 'Honeycomb' fills the screen with hexagons, showing how they link with each other in a honeycomb pattern. Program two takes a pentagon, and by twisting and shrinking it within itself, gives it a slightly three dimensional appearance.

Finally, the best program shows how clusters of polygons can generate other polygons; it cycles through 12 frames of patterns, some of which are spectacular, and all of them interesting. The entire pattern is stored as four or five numbers; try changing the data statements to produce your own displays. If you choose your colour correctly, this can be one of the most artistic programs you will ever see on any micro.



Utility draw

on Spectrum

This program is very easy to use. Listed below are the commands available:

- — input the over.
- d — draw for inputted x and y and draw x and draw y.
- c — circle for inputted x and y co-ordinates of the centre and the radius.
- s — save the design on the screen on tape as a screen \$.
- r — reset the flashing pixel cursor to wherever you want it on the screen.

You move the pixel cursor as below:



Once you have entered the program, to save it on tape, type RUN 550.

To obtain a design like my map of Europe, you need a bit of patience. First draw the design on the TV screen with a water washable pen, and then use the program to copy the design.

Program notes:

- 100 to 110 Titles.
- 120 Initialise the program.
- 130 to 260 Check if any keys are pressed. If they are, check if any of the command keys are pressed. If they are, then do the command required.

Turn to page 16

OPEN FORUM

Continued from page 15

270 to 302 Make sure the pixel cursor does not go off the screen.
310 to 330 Flash the pixel cursor and plotplot over the point it is on, then go back to 130.

340 to 400 Input the ink, border, paper and the over. Check that the numbers inputted are not too big. If they are, go back to 340.
410 to 420 Reset pixel cursor subroutine.
430 to 490 Draw subroutine.

490 to 510 Circle subroutine.
520 to 540 Save the design to a chosen name.
550 Save the program.

PROGRAM OF THE WEEK



Europe
D.P.H. Saffranek

```
100 REM Utility Draw
110 REM © 1982 P. Saffranek
120 GO SUB 340:CLS:LET X=0
130 LET Y=0
140 IF AS=INKEY$ AND AS="0" AND AS<>" " THEN
150 IF AS="0" THEN GO SUB 330
160 IF AS="d" THEN GO SUB 430
170 IF AS="s" THEN GO SUB 490
180 IF AS="c" THEN GO SUB 520
190 IF AS="p" THEN GO SUB 540
200 IF AS="o" THEN GO SUB 550
210 LET X=X+1:IF X=255 THEN LET X=0
220 LET Y=Y+1:IF Y=255 THEN LET Y=0
230 LET X=X+1:IF X=255 THEN LET X=0
240 LET Y=Y+1:IF Y=255 THEN LET Y=0
250 LET X=X+1:IF X=255 THEN LET X=0
260 LET Y=Y+1:IF Y=255 THEN LET Y=0
270 IF X=0 THEN LET X=255
280 IF Y=0 THEN LET Y=255
290 IF X=255 THEN LET X=0
300 IF Y=255 THEN LET Y=0
310 PLOT X,Y:PLOT OVER 1,X,Y
320 PLOT X,Y:PLOT OVER 0,X,Y
330 GO TO 130
340 INPUT "Ink (0-7):" I:IF I>7 THEN I=0
350 IF I=0 OR I>7 THEN GO TO 340
```

```
360 IF P=0 OR I>7 THEN GO TO 340
370 IF B=0 OR I>7 THEN GO TO 340
380 BORDER B:PAPER P:INK I
390 INPUT "Over (0-11):" O:IF O>11 AND O<0 THEN GO TO 390
400 RETURN
410 INPUT "X?":X:IF X>255
420 RETURN
430 INPUT "X Coord?":X:IF X>255
440 RETURN
450 INPUT "Y Coord?":Y:IF Y>255
460 RETURN
470 PLOT X,B:DRAW C
480 RETURN
490 INPUT "X?":X:IF X>255
500 RETURN
510 CIRCLE X,Y,I
520 INPUT "Name?":NAME:LINE 10
530 SAVE "BSCREEN"
540 RETURN
550 SAVE "Utdraw" LINE 100
```

Utility draw
by Peter Saffranek

Eggdash

on BBC Micro

Eggdash is your opportunity to play the role of Dave — the Eggsaver. His prime function in life is to stop the eggs from the heavenly henhouse hitting the earth and hatching into a new life-form threatening to engulf our planet.

By deftly manoeuvring his catcher, he must prevent the eggs ever reaching the ground... every egg saved earns him a bonus point, and spurs him on to greater effort.

Every egg missed smashes, and gives birth. Slowly the alien lifeform increases its power and size until it reaches the catcher, destroys it and poor Dave.

His job prospects are in your hands, or

more accurately, in your two fingers at the two cursor control keys moving his catcher.

The difficulty level applies to the number of eggs descending at once. A large proportion of the program is written in machine code, so the action is fast. The sound effects are achieved by envelopes (lines 270 to 290).

Program notes:

- 10 to 200 Machine code.
- 210 Removes "edit" cursor
- 220 Removes cursor.
- 230 to 260 Defines colours and screen windows
- 270 to 290 Defines envelopes.
- 320 to 410 Basic program loop.
- 420 to 470 Re-run.

The colour control codes are printed down the left-hand edge of the screen and are secured as the screen window is

shortened. The use of negative *Inkey* statements is very useful as it gives priority to the last key pressed. The machine code scans the entire screen, moving down all the capital "O's one space and checking if they hit the catcher "bat" or the ground at the bottom.

Note:

1. When typing in the program from the listing, replace all pound signs (£) with hashes (#).
2. If you escape into the program when it is running, immediately type *FX4,0 to retain the editing cursor.

I have outlined one way of playing this game, but I have found it equally nerve-racking when I try to avoid catching the eggs. My highest score is 82 when I try to catch them; three when I try to miss!

VDU2

>L.

```
10?B2=0
20 INPUT "LEVEL 1=HARD 9=EASY" QW
30 IF QW<10RQW>9 THEN 20
40 QW=QW/10
50 ?B2=0
60 X=HIMEM+940
70 Y=(HIMEM-1) DIV 256
80 DIM C 512
90 FOR PASS=0 TO 2 STEP 2
100 P% = C
110 LOPT PASS
120 .start LDA E(X MOD 256):STA &B0:
LDA E(X DIV 256):STA &B1
130 .loop LDY E&00:LDA (&B0),Y:CMF
E79:BNE skip
140 LDY E40:LDA (&B0),Y:CMF E95:BEG hash
150 CMP E96:BNE go:LDA E32:LDY E&00:
STA (&B0),Y:STA &B2:JMP skip
160 .go LDA E79:STA (&B0),Y:LDY E&00:
LDA E32:STA (&B0),Y:JMP skip
170 .hash LDY E&00:STA (&B0),Y:STA
E255:STA &B8:LDA &B0:STA &B3:LDA
&B1:STA &B4
180 .skip DEC &B0:LDA &B0:CMF E255:BNE
loop:DEC &B1:LDA &B1:CMF EY:BNE loop
190 RTS
```

```
200 J:NEXT PASS:MODE7
210 *FX4,1
220 *FE00=&10200A
230 FOR F=1 TO 15:VDU31,0,F,129:NEXT F
240 VDU31,0,16,131
250 FOR F=1 TO 24:PRINTTAB(0,F)CHR$132:
NEXT F
260 VDU 28,1,24,39,0
270 ENVELOPE1,1,0,0,0,0,0,0,-1,-1,-1,
-1,126,-100
280 ENVELOPE2,1,-1,-1,-1,80,80,126,
-1,-1,-2,126,0
290 ENVELOPE3,1,1,0,0,20,1,1,126,0,0,
-126,126,126
300 X=10:PRINTTAB(1,24)"EEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE"
310 SC=0
320 IF RND(1)>QW THEN ?(HIMEM+41)+RND
(38)=79:SOUND&11,2,-50,5
330 ?B2=0
340 CALL start
350 IF ?B2=32 THEN SOUND&13,3,100,5:
?B2=0:SC=SC+1:PRINTTAB(0,0)SC
360 IF ?B8=255 ?B8=0:SOUND&10,1,4,5:
C=?(&B4)*256+?(&B3):IF C>HIMEM+16*40
AND C<HIMEM+17*40 THEN GOTO 420
```

Turn to page 21

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Continued from page 16

```

370 X=X+INKEY(-26)-INKEY(-122)
380 IF X<0 THEN X=0
390 IF X>30 THEN X=30
400 PRINT TAB(X,15) "-----"
410 GOTO 320
420 FOR F=1 TO 5000: NEXT F
430 CLS: FOR F=1 TO 2: VDU 141: PRINT "YOU
LOSE": NEXT F

```

```

440 PRINT "SCORE="SC
450 PRINT "CHR$136CHR$129"PRESS ANY
KEY"
460 A=GET
470 CLS: RUN

```

Eggdash
by Nick Wilson

Bar graph

on Dragon

This 'Bar Graph' program was written for those interested in analytical data both for semi-serious applications and 'let's have fun with figures' Dragon users. It will print on the screen in bar graph format a tabulation of figures (say income or expenditure) for a six-month period and calculate the grand total for that period

at the same time computing the average. The maximum scale is 20, but at a pinch 25 due to screen size limitations, therefore a 'unit factor' is used, but must be calculated manually.

It should be a fairly simple matter to modify the program to input figures larger than 20 and let the Dragon compute the scale automatically.

The colour bars for each month can be altered to suit one's taste by changing the

CHR\$(143 + ---) commands. See your Dragon manual for colours available. The variables used are A for the amounts, M\$ for the months and AT for the average total also GT for grand total. The p variable decides where on the screen the bars should appear. If required the program can be extended to produce 12-monthly information by introducing six more inputs and print statements, providing you can squeeze it all on the screen.

```

5 REM DRAGON BAR GRAPH BY E. N. MACKRELL
10 CLS 3
20 PRINT "DRAGON CALC BAR GRAPH-INPUT YEAR &
SIX MONTHLY FIGURES"
22 PRINT "MAX SCALE 0-20 USE UNIT FACTOR"
25 LINE INPUT "COMMODITY:";C$
30 LINE INPUT "YEAR:";Y$
35 LINE INPUT "UNIT:";U$
50 INPUT "MONTH:";M1$
60 INPUT "AMOUNT:";A1
70 INPUT "MONTH:";M2$
80 INPUT "AMOUNT:";A2
90 INPUT "MONTH:";M3$
100 INPUT "AMOUNT:";A3
110 INPUT "MONTH:";M4$
120 INPUT "AMOUNT:";A4
130 INPUT "MONTH:";M5$
140 INPUT "AMOUNT:";A5
150 INPUT "MONTH:";M6$
160 INPUT "AMOUNT:";A6
170 CLS
180 PRINT @ 8,C$;
190 PRINT @ 51,"UNIT:";
200 PRINT @ 34,"YEAR:";Y$;
210 PRINT @ 48,Y$;
220 PRINT @ 56,U$;
230 PRINT @ 64,M1$;
240 PRINT @ 96,M2$;
250 PRINT @ 128,M3$;
260 PRINT @ 160,M4$;
270 PRINT @ 192,M5$;
280 PRINT @ 224,M6$;
290 LET P1=67
300 LET P2=99
310 LET P3=131
320 LET P4=163
330 LET P5=195
340 LET P6=227
350 FOR Y=0 TO A1

```

```

360 IF A1>21 THEN PRINT @ P1,CHR$(143+16)
370 P1=P1+1
380 NEXT Y
390 PRINT @ P1,A1
400 FOR M=0 TO A2
410 IF A2>21 THEN PRINT @ P2,CHR$(143+48)
420 P2=P2+1
430 NEXT M
440 PRINT @ P2,A2
450 FOR J=0 TO A3
460 IF A3>21 THEN PRINT @ P3,CHR$(143+32)
470 P3=P3+1
480 NEXT J
490 PRINT @ P3,A3
500 FOR X=0 TO A4
510 IF A4>21 THEN PRINT @ P4,CHR$(143+112)
520 P4=P4+1
530 NEXT X
540 PRINT @ P4,A4
550 FOR T=0 TO A5
560 IF A5>21 THEN PRINT @ P5,CHR$(143+64)
570 P5=P5+1
580 PRINT @ P5,A5
590 NEXT T
600 FOR K=0 TO A6
610 IF A6>21 THEN PRINT @ P6,CHR$(128)
620 P6=P6+1
630 NEXT K
640 PRINT @ P6,A6
650 PRINT @ 448,""
660 LET AT=A1+A2+A3+A4+A5+A6
670 LET P7=323
680 LET AT=AT/6
690 FOR S=0 TO AT
700 IF AT>21 THEN PRINT @ P7,CHR$(131)
710 P7=P7+1
720 NEXT S

```

Turn to page 23

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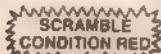
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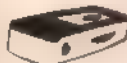


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Continued from page 21

```

730 PRINT SP7,AT
740 PRINT @298,"AVERAGE:"
750 PRINT @448,"";
760 LET GT=A1+A2+A3+A4+A5+A6
770 PRINT @ 352,"GRAND TOTAL ALL MONTHS:"GT
780 PRINT@448,"";
790 LET PB=384
800 FOR W=1 TO 32

```

```

810 PRINT@PB,"-";
820 PB=PB+1
830 NEXT W
850 PRINT"DRAGON CALC-USE UNIT FACTOR"
880 PRINT @448,"";

```

Bar graph
by Ed MacKrell

Joysticks

on Vic 20

The following subroutine can be used at the beginning of any program requiring joy-sticks. It enables all the switches of the stick to be peeked at different memory locations. If a switch is on then a zero is returned at the corresponding location as follows:

Location	Switch
7664	Right
7665	Down

7666	Left
7667	Up
7668	Fire

The subroutine is called by SYS 6656 which must be called before reading the joy-stick. It is protected in memory, but still allows room for user defined graphics. The upper case character set with defined characters can be loaded into locations 7168 to 7679 in the normal way.

If this facility is not required then lines 0 and 1 need to be changed as follows:

```

0 POKE 56,28: POKE 52,28: POKE 51,0: POKE 55,0
1 FOR A = 7168 TO 7218: READ B: POKE A,B: NEXT

```

Machine Code Subroutine

```

0 POKE 56,28: POKE 52,28: POKE 51,0: POKE 55,0
1 FOR A = 8656 TO 8706: READ B: POKE A,B:
NEXT
2 DATA 169,127,141,34,145,173,32,145,41,
128,141
3 DATA 240,29,189,255,141,34,145,173,31,
145,41,8
4 DATA 141,241,29,173,31,145,41,16,141,
242,29,173
5 DATA 31,145,41,4,141,243,29,173,31,145,
41,32,141
6 DATA 244,29,96

```

by Tim Vanes

Basic delete

on ZX81

The program is designed to run in a Sinclair ZX81, and its purpose is to delete part of a Basic program from a specified line number to the end, as in deleting a program used to input machine code, or a basic 'utility' when no longer required.

There are no absolute addresses, so the program, of 34 bytes, may be put anywhere convenient (above 'Ramtop' is usually as good as anywhere).

The program starts from address 16509, where the high byte of the first line number is, examined and compared with the byte inputted. If different; the search progresses to the next line number, but if identical, then the low byte is similarly examined; if

different, the search moves to the next line number. Eventually, when the correct line number is found, and its address known, a 'N/L' character is poked into the address formerly occupied by the high byte of the line number, so that this point is marked as the end of the basic program, and a call is made to 1027 in Rom, which holds a routine for deletion.

ld hl,16509	33,125,64
ld b,(hl)	70
ld a,(hl)	126
cp	254
jr nz,16509	xxx
High byte of first line number for deletion	
(rz),DIS	40,9
inc hl	35
inc hl	35
ld c,(hl)	78
inc hl	35
ld b,(hl)	70
add hl,bc	9

inc hl	35
jr,DIS	24,241
inc hl	35
ld b,(hl)	70
ld a,(hl)	126
cp	254
jr nz,yyy	yyy
Low byte of first line number for deletion	
(rz),DIS	40,2
jr,DIS	24,239
dec hl	43
ld(hl),N	54,118
inc hl	35
ipNN	195,3,4

The two bytes 'xxx' and 'yyy', corresponding to the number of the first line to be deleted, are Poked before running, or a couple of basic lines may be used to do this.

by Robin Mustoe

Zener test

on BBC Micro

This colourful program is based on the testing of people's ESP using Zener cards. The symbols on the cards are represented graphically using the BBC micro's Mode 2 graphics. You must guess the sequence in which the computer has dealt the cards. Instructions are included in the program.

Even if you don't believe in a sixth sense you can still use the program as a game or as an aid to teaching children due to the use of large colourful shapes.

The main subroutines are labelled with Rem statements. The computer's sequence is stored in the array A%(). The subroutine used to shuffle the cards is simple but ensures that no two cards are the same. Your guesses are stored in the array B%().

The star is drawn by plotting triangles first in blue then smaller triangles in black.

The circle is drawn using the formula of $Y = \text{SQR}(R * R - (X * X))$ and is produced using the same method as the star, drawing first in yellow then black. After each five guesses a portion of the screen is cleared. This is achieved by setting up a graphics window so that the top part of the screen is unaffected when a CLG is issued.

```

5 REM** ZENER TEST**NHT-GLJ OCT82**
10 MODE7:DIM A%(5),B%(5)
20 PRINTTAB(12,0);CHR$(141+CHR$(133);"ZENER TEST"TAB(12,1);CHR$(141+CHR$(133);"ZEN
ER TEST"
30 PRINT"THE OBJECT OF THIS PROGRAM IS TO TEST YOUR POWERS OF CLAIRVOYANCE"
40 PRINT"USING YOUR EXTRA-SENSORY PERCEPTION YOU MUST CHOOSE A SEQUENCE OF SHAPES TO"
50 PRINT"CORRESPOND WITH THE COMPUTERS."
60 PRINT"YOU WILL GO THROUGH 5 SUCCESSIVE TESTS."

```

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Continued from page 23

```

40PRINT"AT THE END,THE COMPUTER WILL DISPLAY""YOUR RESULT AS A PERCENTAGE."
50 PRINT"''''TAB(3),CHR$136+CHR$129+"PRESS SPACE BAR TO CONTINUE"
60 S=GET:MODE2
70 REM****DRAW SHAPE+NUMBER****
80 YP%=920:VDU 5
90 FOR DT%=1TO5:XP%=(DT%-1)*256+128:ON DT% GOSUB 300,360,410,450,500
100 GCOL0,7:MOVEXP%-28,800:PRINT:DT%:NEXT VDU4
110 GCOL0,6:MOVE 0,740:DRAW1280,740
120 VDU24,0,0:1279,730:ALLSUM=0:FOR MAINLOOP=1TO5
130 PRINTTAB(0,10),"TEST ";MAINLOOP:"INPUT 5 GUESSES";
140 REM*****RANDOM*SEQUENCE*****
150 A%(1)=RND(5):B%(1)=0:FOR L%=2TO5:B%(L%)=0
160 A%(L%)=RND(5):FOR V%=1TO L%-1:IF A%(L%)=A%(V%) V%=L%:NEXT V%:GOTO160
170 NEXT L%:NEXT
180 REM*****CHOOSE*AND*DRAW*****
190 XP%=128:YP%=450:FOR GL%=1TO5
200 REPEAT N%=GET-48:UNTIL N%>0 AND N%<6
210 FOR GLJ%=1TO GL%:IF B%(GLJ%)=N% VDU7,7,7:GLJ%=GL%:NEXT GLJ%:GOTO 200
220 NEXT B%(GL%)=N%:ON N% GOSUB 300,360,410,450,500:XP%=XP%+256:NEXT
230 REM***DRAW THE RANDOM SEQUENCE***
240 S%=0:XP%=128:YP%=200:FOR LG%=1TO5:N%=A%(LG%):IF A%(LG%)=B%(LG%) S%=S%+1
250 ON N% GOSUB 300,360,410,450,500:XP%=XP%+256:NEXT LG%
260 PRINTTAB(0,29),"SCORE=";S%:"PRESS SPACE BAR"
270 *FX15,1
280 ALLSUM=ALLSUM+S%:G=GET:CLG:NEXT MAINLOOP:PRINT"AVERAGE=";ALLSUM/4;"%";
290 G=GET:RUN
300 REM*****CIRCLE*****
310 SOUND1,-10,30,5:J%=FALSE:GCOL0,3:R%=100
320 SUB%=R%*R%+1:FOR L%=1TOR%:STEP8:Y%=SQR(SUB%-(L%*L%))
330 MOVE(L%+XP%),(Y%+YP%):DRAW L%+XP%,(Y%-Y%):MOVE(XP%-L%),(Y%+YP%)
340 DRAW(XP%-L%),(Y%-Y%):NEXT L%:IF J%=TRUE KL%=TRUE:RETURN
350 R%=80:J%=TRUE:GCOL0,0:GOTO320
360 REM*****SQUARE*****
370 SOUND 1,-10,60,5:GCOL 0,5:TL%=0:WP%=100
380 XX%=XP%-WP%:XY%=YP%-WP%
390 FOR LOOP%=YP%-WP% TO YP%+WP% STEP4:MOVE XX%,LOOP%:DRAW XY%,LOOP%:NEXT
400 IF TL%=TRUE:RETURN ELSE GCOL 0,0:WP%=78:TL%=TRUE:GOTO 380
410 REM*****CROSS*****
420 SOUND 1,-10,90,5:GCOL 0,1:FOR LOOP%=-10 TO 10 STEP 2
430 MOVE XP%+100,YP%+LOOP%:DRAW XP%+100,YP%+LOOP%:MOVE XP%-LOOP%,YP%+100
440 DRAW XP%-LOOP%,YP%-100:NEXT LOOP%:KL%=TRUE:RETURN
450 REM*****TRIDENT*****
460 SOUND 1,-10,120,5:GCOL 0,2:FOR LOOP%=-10 TO 10 STEP 4
470 MOVE XP%+LOOP%,YP%+100:DRAW XP%+LOOP%,YP%+100:MOVE XP%+LOOP%,YP%+100
480 DRAW (XP%+LOOP%)-80,YP%-100:MOVE XP%+LOOP%,YP%+100
490 DRAW (XP%+LOOP%)+80,YP%-100:NEXT LOOP%:KL%=TRUE:RETURN
500 REM*****STAR*****
510 SOUND 1,-10,150,5:GCOL 0,4
520 MOVE XP%-100,YP%-50:MOVE XP%+100,YP%-50:PLOT 85,XP%,YP%+100
530 MOVE XP%-100,YP%+50:MOVE XP%+100,YP%+50:PLOT 85,XP%,YP%-100
540 MOVE XP%-60,YP%-30:MOVE XP%+60,YP%-30:PLOT 87,XP%,YP%+70
550 MOVE XP%-60,YP%+30:MOVE XP%+60,YP%+30:PLOT 87,XP%,YP%-70
560 KL%=TRUE:RETURN

```

Zener test
by G. Jones

Animals

on ZX81

This program was written by my two daughters to run on a ZX81. The idea is so simple that it could easily be converted to run on any computer. In devising the program it helped their education con-

siderably by trying to distinguish one animal from another (if anyone can write the difference between a duck and goose so that a child of eight could understand I would be interested to see it). At the moment they are extending the program to include all the animals in the UK.

The program can be made to re-run

itself by changing each line that has STOP in it to:

```

1300 ... THEN GOTO 1300
1300 PRINT "DO YOU WANT TO TRY AGAIN?"
1310 INPUT BS
1320 IF BS = "Y" THEN GOTO 22
1330 PRINT "OK ILL SAY GOODBYE"
1340 FOR A = 1 TO 50
1350 NEXT A
1360 NEW

```

```

2 REM "ANIMALS"
4 REM " COPYRIGHT C AND E SAYERS 1982"
5 PRINT " I WANT YOU PLAY A GAME WITH YOU; AT 5,5;
  " THINK OF A DOMESTIC OR FARM ANIMAL"
10 PAUSE 500
12 CLS
15 PRINT NOW I WILL ASK YOU SOME QUESTIONS; AT 5,0; " JUST
  ANSWER YES WITH THE Y KEY AND NO WITH THE N KEY"
20 PAUSE 500
22 CLS
25 PRINT " ARE YOU READY HERE COMES THE 1ST QUESTION"
26 PAUSE 100
28 CLS
30 PRINT " HAS IT GOT 2 LEGS?"
40 INPUT AS
45 CLS
50 IF AS = "N" THEN GOTO 200
52 PRINT " HAS IT GOT FEATHERS?"
54 INPUT ZS
55 CLS
56 IF ZS = "N" THEN GOTO 1100
60 PRINT " CAN IT SWIM?"
70 INPUT BS
75 CLS
80 IF BS = "N" THEN GOTO 130
90 PRINT " IS IT A MALE?"
100 INPUT CS
105 CLS
110 IF CS = "Y" THEN PRINT AT 10,0; " ITS A DRAKE
  OR A CANDAER"
120 IF CS = "N" THEN PRINT AT 10,0; " ITS A DUCK
  OR A GOOSE"
125 STOP
130 PRINT " DOES IT GIVE US EGGS?"
140 INPUT DS
145 CLS
150 IF DS = "Y" THEN PRINT AT 10,0; " ITS A HEN"
155 IF DS = "Y" THEN STOP
160 PRINT " DOES IT SAY GIBBLE GIBBLE?"
170 INPUT ES
175 CLS
180 IF ES = "Y" THEN PRINT AT 10,0; " ITS A TURKEY"
185 IF ES = "Y" THEN STOP
190 IF ES = "N" THEN GOTO 700
195 STOP
200 PRINT " DOES IT LIVE ON A FARM?"
210 INPUT FS
215 CLS
220 IF FS = "Y" THEN GOTO 420
230 PRINT " DOES IT WASH ITS FACE?"
240 INPUT GS
250 IF GS = "Y" THEN PRINT AT 10,0; " ITS A CAT "
255 IF GS = "Y" THEN STOP
260 PRINT " DOES IT HAVE A TAIL?"
270 INPUT HS
275 CLS
280 IF HS = "N" THEN PRINT AT 10,0; " ITS A GUINEA
  PIG"
285 IF HS = "N" THEN STOP
290 PRINT " IS IT BIGGER THAN A RAT?"
300 INPUT IS
305 CLS
310 IF IS = "Y" THEN GOTO 380
320 PRINT " DOES IT LIVE IN A SEWER?"
324 INPUT JS
326 CLS
328 IF JS = "Y" THEN PRINT AT 10,0; " ITS A RAT",
  " UGH HOW NASTY"
329 IF JS = "Y" THEN STOP
330 PRINT " DOES IT HAVE BIG EYES?"
340 INPUT JS
350 CLS
360 IF JS = "Y" THEN PRINT AT 10,0; " I THINK ITS A
  GERBIL"
365 IF JS = "Y" THEN STOP
370 PRINT AT 10,0; " IS IT A LITTLE HOUSE?"
375 GOTO 600
380 PRINT " DOES IT WAG ITS TAIL?"
390 INPUT KS
395 CLS
400 IF KS = "Y" THEN PRINT AT 10,0; " ITS A DOG"

```

```

410 IF VS = "N" THEN PRINT AT 10,0; " IS IT
  A RABBIT?"
415 GOTO 600
420 PRINT " HAS IT GOT HORNS?"
430 INPUT LS
435 CLS
440 IF LS = "Y" THEN GOTO 500
450 PRINT " DOES IT GIVE US WOOL?"
460 INPUT MS
470 CLS
480 IF MS = "Y" THEN PRINT AT 10,0; " ITS A SHEEP"
490 IF MS = "N" THEN GOTO 900
495 STOP
500 PRINT " IS IT A FEMALE?"
510 INPUT PS
515 CLS
520 IF PS = "Y" THEN PRINT AT 10,0; " ITS A COW"
525 IF PS = "Y" THEN STOP
530 PRINT " DOES IT GIVE US WOOL"
540 INPUT SS
545 CLS
550 IF SS = "Y" THEN PRINT AT 10,0; " ITS A RAM"
560 IF SS = "N" THEN PRINT " IS IT A BULL?"
600 INPUT US
610 CLS
620 IF US = "Y" THEN PRINT AT 10,0; " I THOUGHT
  625 PRINT " IS IT A FISH, A TORTOISE OR A
  [ 2 spaces.] FROG?"
630 INPUT US
632 CLS
635 IF US = "Y" THEN PRINT " NONE OF THESE ARE
  ANIMALS SILLY"
645 IF US = "N" THEN PRINT " YOU HAVE BEATEN ME," " I
  DONT KNOW WHAT IT IS"
650 STOP
700 PRINT " DOES IT LIVE IN A CAGE IN A HOUSE?"
710 INPUT VS
715 CLS
720 IF VS = "N" THEN PRINT AT 10,0; " ITS A
  COCKEREL"
725 IF VS = "N" THEN STOP
750 PRINT " ARE SOME OF THESE GREEN?"
760 INPUT WS
770 CLS
780 IF WS = "N" THEN PRINT AT 10,0; " ITS A CANARY"
790 IF WS = "N" THEN STOP
800 PRINT " DO THEY SOMETIMES HAVE " " RED
  FEATHERS?"
810 INPUT XS
815 CLS
820 IF XS = "Y" THEN PRINT AT 10,0; " ITS A PARROT"
830 IF XS = "N" THEN PRINT AT 10,0; " I THINK ITS A
  BUDGIE"
840 STOP
900 PRINT " DOES IT HAVE HOOVES?"
910 INPUT YS
920 CLS
930 IF YS = "N" THEN PRINT AT 10,0; " ITS A
  SHEEPDOG"
940 IF YS = "N" THEN STOP
950 PRINT " DOES IT HAVE HORNS?"
960 INPUT ZS
965 CLS
970 IF ZS = "Y" THEN PRINT AT 10,0; " I THINK ITS A
  COAT"
980 PRINT " DOES IT HAVE A CURLY TAIL?"
990 INPUT AS
1000 CLS
1010 IF AS = "Y" THEN PRINT AT 10,0; " ITS A BIG FAT
  PIG"
1020 IF AS = "N" THEN PRINT AT 10,0; " I THINK ITS A
  HORSE"
1030 STOP
1100 PRINT AT 10,0; " IT MUST BE THE FARMER," " OR
  HIS WIFE"

```

Animals
by Derek Sayers

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PROGRAMMING

Mastering the art

R Morgan presents a drawing routine for the Vic20 with Super-Expander.

This hi-res drawing program runs on a Vic20 with joystick and Super-Expander cartridge. It allows you to specify the start position and the screen, border and plot colours.

The program has two modes — one allows you to draw, while the other allows you to rub-out. The rub-out mode can also be used to move the cursor without actually drawing. The program also produces a flashing cursor in both modes.

The program starts by displaying instructions. The user is then asked to input the required resolution, which should be in the range 1-3 (1 & 3 being multi-colour modes, and 2 being the highest resolution).



Next, the user is required to input the screen, border, and plotting colours. These should all be in the range 0-15, according to the colour list in the Super-Expander manual. The program is mugged for incorrect inputs.

If the user wants to rub-out, or move without drawing, then he must press the arrow key next to the "1" key. The cursor will then rub-out any points drawn on the screen. If no points have been plotted, the cursor will move without making any lines. To re-start drawing, the user simply pushes the "1" key.

The user may also clear the screen at any time by pushing the space-bar. He may also leave the program by pushing the "0" key.

The variables are:

Plot co-ordinates — x,y

R is the resolution

sc is the screen colour.

bc is the border colour.

pc is the plotting colour.

Z determines draw or erase mode.

READY.

```

10 REM SKETCHPAD
20 REM FOR VIC-20 + SUPER EXPANDER
30 REM AND JOYSTICK
35 REM (C) R.P.MORGAN
40 PRINT "*****"
50 PRINT " * * "
60 PRINT " * SKETCHPAD * "
70 PRINT " * * "
80 PRINT "*****"
90 PRINT "USE JOYSTICK TO
  DRAW ON THE HI-RES SCREEN."
100 PRINT "PRESS ← TO RUB-OUT,
  THEN 1 TO RE-START DRAWING."
105 PRINT "PRESS [SPACE] TO
  CLEAR SCREEN."
110 PRINT "PRESS * TO END."
115 PRINT "PRESS A KEY
  "
120 POKE198,0:WAIT198,1:POKE198,0
130 PRINT "INPUT START COOR
  DINAT-ES (X,Y)":INPUTX,Y
140 IF(X*Y)<0OR(X*Y)>1023
  THEN130
150 INPUT"RESOLUTION ":R:IFR<1
  ORR>3THEN150
160 INPUT"SCREEN COLOUR ":SC:IF
  SC<0OR SC>15THEN160
170 INPUT"BORDER COLOUR ":BC:IF
  BC<0OR BC>15THEN170
180 INPUT"PLOT COLOUR ":PC:IFPC
  <0ORPC>15THEN180
190 GRAPHICR:Z=2
200 COLORSC,BC,PC,0
210 A=RJOY(0):GETA$
220 POINTZ,X,Y
230 X=X-(A=8)+(A=4)
240 Y=Y-(A=2)+(A=1)
250 IFA=5THENX=X-1:Y=Y-1
260 IFA=9THENX=X+1:Y=Y-1
270 IFA=6THENX=X-1:Y=Y+1
280 IFA=10THENX=X+1:Y=Y+1
290 POINT2,X,Y
290 IFA$="←"THENZ=0
300 IFA$="1"THENZ=2
310 IFA$=" "THEN500
315 IFA$="*"THEN700
320 POINT0,X,Y
330 GOTO210
500 SCNCLR:GOTO320
700 GRAPHIC0:PRINT"0":END
  
```

READY.
READY.

Commodore

VIC-20 II

SUPER EXPANDER WITH
3K RAM CARTRIDGE

Hard grind no longer

David Lawrence presents a melody maker program for Saving tunes on cassette.

Hopefully no one who owns a Spectrum is too disappointed by the fact that the aptly named *Beep* command is never going to amaze their friends with concert grade sounds. Even if you accept the limitations of the Spectrum's single-channel sound, its lack of flexibility is something of a let-down. Anyone who has tried to program even the simplest tune will know just what a chore it can be.

What you need is a flexible method of entering, correcting and storing tunes on the Spectrum. This program sets out to do just that. As it stands, the program allows the user to develop up to 50 tunes on a 48K Spectrum, to store them by name and to recall them at a later date.

The main routine within the program lies between lines 1190 and 1450. It permits the user to input notes in the form of numbers from 1-24 (representing the notes of three octaves in the key of C major). Note duration may also be input in units of 64ths of a second. The functions available in this routine are as follows:

- A — add notes to the end of the tune so far developed
- I — insert one or more notes after any specified notes
- D — delete any specified note
- N — delete whole of current tune under development
- S — place current tune in dictionary after naming it
- P — play whole of current tune
- L — list up to 40 notes in the current tune, from a specified starting point
- Z — quit this section of the program
- PP — play part of the current tune between specified points.

Apart from this routine, the program also allows you to delete tunes already placed in the dictionary and to call up named tunes which have been stored previously. Tunes may be recalled to be played, to be developed further (the tune recalled becomes the current tune for the purpose of the main routine described above), or for the tune's data to be stored on cassette. Once stored on cassette, the data may be picked up by other programs and replayed by the use of a short routine such as that shown in listing 2.

Owners of 16K machines will not be able to make full use of the dictionary of stored tunes, especially since the tunes are stored in undimensioned strings — fast for insertion and deletion but expensive on memory due to the Spectrum's annoying habit of creating momentary shadow strings when adding characters to a variable length string. There is no reason, however, why users of 16K machines should not use the routine which develops and saves such tunes for use by other programs. More musically advanced read-

ers may like to add a provision to change the tempo and key of tunes on replay, using methods like those outlined in the relevant chapter of the Spectrum manual.

Commentary

- 1240 & 1270 The variable PLACE is used to dictate the point at which new notes are added to the string MS which contains the data for the tune under development.
- 1280 Note the ease with which 2 characters may be deleted using Sinclair Basic's flexible string slicing.
- 1320 This line reprints note values for listing — the first character in each character pair stores the actual note in the form of a CODE value, the second character stores the duration of the note.
- 1330 Note that there is a provision for a pause in the tune. This is achieved by entering 0 for the note value and the appropriate figure for the duration.
- 1400 Note that the names of tunes to be stored are placed in the array NS. MS is added to the dictionary by tacking it on to the end of the

variable length string, SS, recording its start and finish position in the array S. The variable TUNES records the number of tunes stored + 1. Note also that a space is always added to the end of SS in order that, when deleting entries from the dictionary, the program does not generate an error message by referring to a position in the string which does not exist (see line 1800).

- 1420-1440 These lines permit the actual entry of notes and places them into the tune currently under development.
- 1490 LIMIT1 and LIMIT2 are used to allow the user to specify start and finish points for playing a tune. This line sets them when the whole of the tune is to be played.
- 1700 Note here how the values in the array S are used to quickly pick up the specified portion of the whole dictionary.
- 1715 You may wonder why a special string, XS is created here. The answer is that an undimensioned string cannot be successfully saved and loaded again.
- 1800 Note again how easily an entry is deleted from the dictionary using the Spectrum's flexible string handling.

```

1000 REM *****
1010 REM *****
1020 REM *****
1030 INK 6: PAPER 2: CLS: PRINT
1040 G: G: PAPER 2: INK 7:
1050 PRINT *****
1060 PRINT *****
1070 PRINT *****
1080 PRINT *****
1090 PRINT *****
1100 PRINT *****
1110 PRINT *****
1120 PRINT *****
1130 PRINT *****
1140 PRINT *****
1150 PRINT *****
1160 PRINT *****
1170 PRINT *****
1180 PRINT *****
1190 PRINT *****
1200 PRINT *****
1210 PRINT *****
1220 PRINT *****
1230 PRINT *****
1240 PRINT *****
1250 PRINT *****
1260 PRINT *****
1270 PRINT *****
1280 PRINT *****
1290 PRINT *****
1300 PRINT *****
1310 PRINT *****
1320 PRINT *****
1330 PRINT *****
1340 PRINT *****
1350 PRINT *****
1360 PRINT *****
1370 PRINT *****
1380 PRINT *****
1390 PRINT *****
1400 PRINT *****
1410 PRINT *****
1420 PRINT *****
1430 PRINT *****
1440 PRINT *****
1450 PRINT *****
1460 PRINT *****
1470 PRINT *****
1480 PRINT *****
1490 PRINT *****
1500 PRINT *****
1510 PRINT *****
1520 PRINT *****
1530 PRINT *****
1540 PRINT *****
1550 PRINT *****
1560 PRINT *****
1570 PRINT *****
1580 PRINT *****
1590 PRINT *****
1600 PRINT *****
1610 PRINT *****
1620 PRINT *****
1630 PRINT *****
1640 PRINT *****
1650 PRINT *****
1660 PRINT *****
1670 PRINT *****
1680 PRINT *****
1690 PRINT *****
1700 PRINT *****
1710 PRINT *****
1720 PRINT *****
1730 PRINT *****
1740 PRINT *****
1750 PRINT *****
1760 PRINT *****
1770 PRINT *****
1780 PRINT *****
1790 PRINT *****
1800 PRINT *****
1810 PRINT *****
1820 PRINT *****
1830 PRINT *****
1840 PRINT *****
1850 PRINT *****
1860 PRINT *****
1870 PRINT *****
1880 PRINT *****
1890 PRINT *****
1900 PRINT *****
1910 PRINT *****
1920 PRINT *****
1930 PRINT *****
1940 PRINT *****
1950 PRINT *****
1960 PRINT *****
1970 PRINT *****
1980 PRINT *****
1990 PRINT *****

```

```

1400 REM *****
1410 REM *****
1420 REM *****
1430 REM *****
1440 REM *****
1450 REM *****
1460 REM *****
1470 REM *****
1480 REM *****
1490 REM *****
1500 REM *****
1510 REM *****
1520 REM *****
1530 REM *****
1540 REM *****
1550 REM *****
1560 REM *****
1570 REM *****
1580 REM *****
1590 REM *****
1600 REM *****
1610 REM *****
1620 REM *****
1630 REM *****
1640 REM *****
1650 REM *****
1660 REM *****
1670 REM *****
1680 REM *****
1690 REM *****
1700 REM *****
1710 REM *****
1720 REM *****
1730 REM *****
1740 REM *****
1750 REM *****
1760 REM *****
1770 REM *****
1780 REM *****
1790 REM *****
1800 REM *****
1810 REM *****
1820 REM *****
1830 REM *****
1840 REM *****
1850 REM *****
1860 REM *****
1870 REM *****
1880 REM *****
1890 REM *****
1900 REM *****
1910 REM *****
1920 REM *****
1930 REM *****
1940 REM *****
1950 REM *****
1960 REM *****
1970 REM *****
1980 REM *****
1990 REM *****

```



Impressed in the memory

Keith and Steven Brain
present a diary program for 1983.

Following our demonstration of how to impress your friends and relatives by getting your Dragon to help you with the Christmas chores (*Popular Computing Weekly*, December 16/23), we came up with a 1983 Computer Diary. This uses a large array and some tricky slicing and scrolling techniques to produce a computer diary which can be used just like any other. The virtually instantaneous speed at which the string slicing and the array manipulation takes place shows the power of the direct addressing of the 6809 CPU and the Microsoft Extended Color Basic.

Enter this program, press Run, and a 1983 calendar will be produced. Of course this will not all fit on the screen once — the initial display only shows the first few days of January, with a flashing cursor on the first date. This is no problem as you can scroll the screen up and down with the arrow keys, to display any part of the year. If you use shifted arrow keys, everything moves 10 times faster.

To use this program as a diary you can add text to the right-hand side of the screen by pressing the A key twice. Your entry is line input and can be edited as usual, at the bottom of the screen, before being entered into the array and displayed on the screen. Since the day and date displays take up the first six characters, this appears to limit the amount of information you can include. But, fear not, if you try the right and left arrow keys (and their shifted versions) you will find you can move the text to left and right.

In fact any particular line can be up to 255 characters long, and any 25 of these characters can be shown at any one time. The whole diary will be filled when there is an average of about 55 characters a line. You now add more information, it will be put in front of the first character in the text display (ie in front of what is already there). If you want to add it behind this then simply move the line to the left before adding.

If you want to delete something just press D twice and the first character in the display will be deleted.

Once you have added all the information you want, then you can Save your diary as a data file on cassette, by setting up your recorder and then pressing S for Save. To recall this at a later date, just Skip to the start of this file and press L to Load it back.

Once the program has been Run the first time and the array saved, lines 20-170, which set up the calendar as the first six characters of each array element, can be deleted.

Program explanation

Line 10 makes space (24000 characters) and sets up the array (A\$(377)) and diary display line length (B). D\$(5) contains the abbreviations for the days of the week. Lines 10-130 and line 170 contain subroutines making the first two characters in each array element the appropriate month title, and the next two characters the day of the month.

Line 170 truncates the three characters produced by taking the Str\$ value of Mo to two to save space. Lines 135 and 136 add the running instructions which are displayed while lines 140-160 add the date and the day of the week to the array elements.

Line 180 is the start of the running routine and sets the display position in the array (D) to 7 (January 1). Line 190 prints out the first 13 elements of the array (five blanks + Jan 1-8). Line 200 checks for

Inkey\$ and, if there is no key pressed, draws a flashing cursor by looking at the value present at the start of the line.

Line 300 checks if D for delete has been pressed, and if so displays a flashing cursor at the start of the text part of the display. When D is pressed again to confirm that the position is correct, the program goes to the delete subroutine at line 360. Line 310 similarly checks for A to add, and leads to the add subroutine at line 370.

The delete subroutine at 360 divides the displayed text string at the left-hand end, leaving out the first displayed character. The add subroutine at 370 requests a line input, which can be corrected before entering with the normal editor facility. If the maximum string length (255) is reached an error message is printed and the line input is discarded.

```
10 PCLEAR1: CLEAR24000: CLS4: PRINT#60, "COMPUTER 1983 DIARY":
  PRINT#256, "CALENDAR
  UNDER CONSTRUCTION": PRINT#450, "COPYRIGHT K & S BRAIN 121282": B=25:
  DIM A$(377): D$(5)="s a s u n o t u w e t h f r"
20 FOR Y=1 TO 1: MO=Y: MO="J": GOSUB170: NEXT
30 FOR Y=32 TO 59: MO=Y-31: MO="F": GOSUB170: NEXT
40 FOR Y=60 TO 90: MO=Y-59: MO="M": GOSUB170: NEXT
50 FOR Y=91 TO 120: MO=Y-90: MO="A": GOSUB170: NEXT
60 FOR Y=121 TO 151: MO=Y-120: MO="M": GOSUB170: NEXT
70 FOR Y=152 TO 181: MO=Y-151: MO="J": GOSUB170: NEXT
80 FOR Y=182 TO 212: MO=Y-181: MO="A": GOSUB170: NEXT
90 FOR Y=213 TO 243: MO=Y-212: MO="S": GOSUB170: NEXT
100 FOR Y=244 TO 273: MO=Y-243: MO="M": GOSUB170: NEXT
110 FOR Y=274 TO 304: MO=Y-273: MO="D": GOSUB170: NEXT
120 FOR Y=305 TO 334: MO=Y-304: MO="F": GOSUB170: NEXT
130 FOR Y=335 TO 365: MO=Y-334: MO="M": GOSUB170: NEXT
135 CLS2: PRINT#64, "TO ALTER DATE USE UP/DOWN ARROWS": PRINT#128, "TO
  SCROLL TEXT
  USE L/R ARROWS": PRINT#192, "TO MOVE FASTER USE SHIFTED ARROW":
  PRINT#256, "TO ADD
  CHARACTERS USE 'A': PRINT#320, "TO DELETE CHARACTERS USE 'D':
  PRINT#384, "TO SAVE TO CASSETTE USE 'S': PRINT#448, "TO LOAD FROM
  CASSETTE USE 'L'":
140 FOR YE=6 TO 37: STEP 7: YE=YE: FOR D=1 TO 13: STEP 2: YE=Y+1: IF YE=37: THEN 160
150 D=MID$(D$(YE), D, 2): A$(YE)=A$(YE)+D:
160 NEXT D, YE
170 A$(YE)=A$(YE)+RIGHT$(STR$(MO), 2): RETURN
180 CLS: C=7
190 A=1: PRINT#0, "": FOR N=(D+6) TO (D+6): PRINT#128, A$(N): L=A+5: NEXT
200 I=INKEY$: IF I="" THEN 2: PEEK(1216): POKE1216, 159: POKE1216, 2: GOTO280
  ELSE I=ASC(
18: IF I=94: THEN D=D-1
210 IF I=10: THEN D=D+1
220 IF I=95: THEN D=D-10
230 IF I=91: THEN D=D+10
240 IF D<1: THEN D=7
250 IF D>37: THEN D=37
260 IF I=8: THEN A=A+1: GOTO340
270 IF I=9: THEN A=A-1: GOTO350
280 IF I=2: THEN A=A+10: GOTO340
290 IF I=93: THEN A=A-10: GOTO350
300 IF I=68: THEN TE=PEEK(1222): POKE1222, 191: POKE1222, TE: I=INKEY$:
  IF I="" THEN 3: THEN 300: L=360
310 IF I=65: THEN TE=PEEK(1222): POKE1222, 159: POKE1222, TE: I=INKEY$:
  IF I="" THEN 3: THEN 310: L=370
320 IF I=76: THEN 300
330 IF I=83: THEN 300: ELSE 190
340 IF A=249: THEN A=249: GOTO280: ELSE B=MID$(A$(D), A+6, B): PRINT#190, B:
  GOTO280
350 IF A=1: THEN A=1: GOTO280: ELSE B=MID$(A$(D), A+6, B): PRINT#190, B:
  GOTO280
360 A$(D)=MID$(A$(D), 1, A+5): A$(D)=A$(D): A=A+1: A$(D)=A$(D)+B: B=
  MID$(A$(D), A+6, B): PRINT#190, B: GOTO280
370 PRINT#416, "ADD": LINE INPUT A$: A$(D)=MID$(A$(D), 1, A+5): A$(D)=MID$(
  A$(D), A+6, B): IF
  LEN A$(D)+LEN A$(D)+LEN A$(D)>255: THEN A$(D)=A$(D)+A$(D)+A$(D): B=
  MID$(A$(D), A+6, B): PRINT#416, "LINE NOW TOO LONG"
380 OPEN "C:\DI\DATA" FOR N=1 TO 37: PRINT#1, A$(N): NEXT C: CLOSE#1:
  GOTO190
390 OPEN "C:\DI\DATA" FOR N=1 TO 37: IF EOF(1) THEN 4: THEN 4: ELSE INPUT#1,
  A$(N): NEXT
400 CLOSE#1: GOTO180
```

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem **Peek it to Ian Beardsmore** and every week he will **Poke** back as many answers as he can. The address is **Peek & Poke, PCW, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.**

WATCHING WHEN YOU HIT THE WALL

D Soards of Worlds End, Kelvedon, Essex, writes:

Q I have recently acquired a BBC model A micro. I am now trying to write a *Pacman* type program. But, as with *Space Invaders* and other similar programs, I have a problem. How do you know if your *Pacman* has hit the wall of a maze? Is there a simple way to find this out?

A Perhaps the easiest way to do this would be to use the *Point* command. The *Point* command returns a logical number for a colour found at a set of co-ordinates (x,y). So if you were using two colours it would return 1 or 0, if you were using four colours then 0 - 3, and so on.

Thus, if the walls of your maze, or your space invader, are a particular colour, and your *Pacman* or missile another colour, all you have to do is keep track of their relative positions. These co-ordinates would then be read by a line to the effect *If Point (x,y) = a Then ...* where *a* is the colour code number of your invader. Then, if the position of your missile at x,y is the same as a point that has the colour of an invader, the program will *Goto* or *Gosub* a 'hit' routine.

A line like *If Not Point (x,y) = a Then ...* would let the program continue on its way if a 'hit' has not been scored.

YOU WEREN'T LUCKY LAST TIME

B H Norton of Beech Avenue, Witherby, Hull, writes:

Q My first 16K Spectrum had to be replaced. My new one has the redesigned circuit board. If I accidentally leave the Ear connection in when I am *Saving* or *Verifying*, programs are not lost as they were with the original machine. Is this an unannounced enhancement or am

I just lucky as I now have sufficient confidence to leave the connections in all the time? I would just like to make sure that no damage is being done. I have a Binatone recorder with auto record level, that I used with both of the Spectrums.

A I can assure you that no damage is being done and you are not lucky in having an unspecified enhancement. Instead, you were unlucky in that the first Spectrum you had did not work properly. You should be able to leave both the Ear and the Mic lead in all the time, without causing damage and without losing a program after executing the *Save* command.

I have already mentioned about chickens coming home to roost with regard to the *Load/Save* problems of the ZX81 being transferred to the Spectrum. Just to repeat this point, because it is still the cause of quite a few letters, the Spectrum's *Load/Save* functions have been considerably enhanced when compared to the ZX81. There should be no problems as long as the instructions in the manual are followed.

LAGGING BEHIND IN GCE MARKET

Elizabeth Hogarth of Lady-smith Avenue, Whithy, writes:

Q I would like to ask your assistance about computer tapes for GCE exams. I have a 16K Spectrum on order and wish to acquire some educational tapes. Are there any for the 16K Spectrum? If so, could you tell me how much they cost, and where I could get them from?

A At the moment the educational market for the ZX Spectrum seems to be lagging behind the games market, but the same thing happened with the ZX81. I do not think that you will see a lot of educational material coming out for the Spectrum till later in the year.

It would seem that the companies producing educational software for the ZX81 are developing software for the Spectrum. The main companies here are Calpac, 108 Hermitage Woods, St Johns, Woking, Surrey; AVC Software, PO Box 415, Birmingham 17; Saxon Computing 3, St Catherine's Drive, Leconfield, Beverley, Humberside.

EZUG (Educational ZX Users Group), of Highgate School, Birmingham, is geared specifically to the use of ZX computers in education. It might be best to write to them first. Please enclose a SAE, and ask for any information they have.

YES, BOTH ARE CORRECT

Adrian Comley of Five Acres, Charmouth, Dorset, writes:

Q I have two questions. First, in your magazine of November 4, in your letters page, someone wrote and said that he had a 3.5K Vic20. The specification says that there is 5K Ram. Which is correct?

The second question concerns the Vic tape recorder. Some people say that only Commodore's tape recorder can be used with the Vic20. Is this true?

A As regards the Vic's memory, there is 5K of it. However, all computers need to use some of this Ram to store variables, and some to store the screen. On the Vic this takes up 1.5K. So, the 5K Ram specification is correct, but with only 3.5K available to the user.

A similar situation occurs with the ZX Spectrum which has a 16K specification, but only 9K available to the user.

Commodore's tape recorder is the only one designed to work with the Vic20.

RECOMMENDED FOR COBOL

Graham Seales of Shakespeare Avenue, Hayes, Middlesex, writes:

Q I am now fairly confident that I have mastered Basic. But I am going to delve into Cobol and I was hoping you could tell me if there are any good books on the subject. Also, are there any plans to bring out binders for *Popular Computing Weekly*?

A There are many books on Cobol. Two that have been recommended to me are *Cobol for Beginners* by T. Worth, published by Prentice Hall (ISBN 0131393782), which is expensive, and *A Simplified Guide to Structured Cobol Programming* published by Wiley (ISBN 0471582840).

I feel that your best choice, as you live near London, would be to go up to Foyle's Bookshop in the Charing Cross Road, or Dillons University Bookshop in Mallett Street. Both have a good selection of computer books from which you could make a more informed choice.

While on the subject of books, I have recently seen *Georges Computer Book Catalogue* which lists over 3,500 computer books, including over 50 on Cobol. Not a book for the casual buyer, but it would be useful for the serious programmer. Georges are based at 89, 81 and 52 Park Street, Bristol BS1.

There are no plans to bring out binders immediately, but they may appear later.

THE SHAPE OF THINGS TO COME

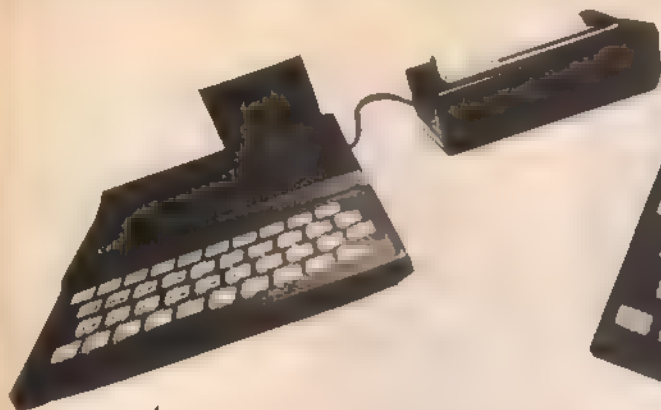
Les Wynne of Grays Road, Crawley, Sussex, writes:

Q I have an Atari 400 and am quite pleased with it. But I would like to build some electronic projects for it. As the Amber printer uses a joystick port, it appears that it can be reconfigured to act as an input/output port. It would certainly make some of the projects I would like to try a great deal easier as well as extending the range of the computer.

If it can be reconfigured can you tell me how: which bits go to which ports, and where in the memory the joysticks are stored?

A Yes, the joystick port can be reconfigured, and it would be useful to do, as many projects need an input/output port to work. I telephoned Atari, and they suggested that the *Hardware Operation Users Manual* and *De Re Atari* be consulted. At the time of writing I have not been able to take a look at either, but they should both be available from Atari and Atari approved dealers.

WIN A ZX SPECTRUM



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Battlestar

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"Enemy ship straight ahead, sir. I think it's a Hornet and it's within range of our lasers. Shall we attack, or should we drop down one orbit and avoid the Scarab coming up behind?" This is just one of the possible scenarios that could face you in *Battlestar* — a computer moderated, play-by-mail, game.

Devised specially for *Popular Computing Weekly* by Slarford organiser Mike Singleton, *Battlestar* is centred around one of the Empire's fortress planets *Knox II*. Located near the outer rim of the Milky Way, in the seventh quadrant, *Knox II* holds one of the Empire's last treasure vaults. The fleet of Empire starships guarding the planet have been called away to put down a rebellion, leaving the treasure vault unguarded save for robot controlled missile stations.

There are 40 moons orbiting *Knox II*, 35 in an outer ring and five in an inner ring. Each moon also contains a number of robot controlled missile stations and one port dome.

Each player controls a fleet of eight ships and starts at one of the outer moons. The ships circle the moon counter-clockwise, travelling in various orbits. The speed of the ships depends on the height of the orbit — the higher the orbit, the slower the speed.

The players must manoeuvre their ships as close as possible to the port dome, while avoiding asteroids, missile bases and each other. A matter transmitter in the port dome operates automatically after three turns. The ship closest to the port dome (and the rest of that player's fleet) is transported to one of the inner moons. The remaining players on the outer moon are eliminated from the game.

This process is repeated on the inner moons, so that five players are transported to *Knox II*. The winning player, whose ship is closest to the port dome on *Knox II*, is transported to the treasure vault.

Prizes

- The winner will receive a ZX Spectrum.
- The four losing semi-finalists will each receive a ZX81.
- Each of the 245 winners of the preliminary competition will receive a voucher entitling them to £10 off a ZX Printer.

At the start of the game, each player will receive a set of rules and a colour print-out showing one of the outer moons. The player's own ships will be coloured blue, while enemy ships will be either red, brown, yellow, green, purple or orange.

After studying the print-out, each player decides on his moves for that turn and posts them back, together with a stamped (first class) addressed envelope and a coupon from *Popular Computing Weekly*. All the moves are then fed into a computer, which generates a new print-out showing the current positions of all the ships. Each turn takes two weeks.

We shall report on the progress of *Battlestar* in future issues of *Popular Computing Weekly*.

In order to limit numbers to a manageable size, we have devised a preliminary competition. All you have to do is answer five simple questions on the form below and send it with a SAE to: *Battlestar*, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2. But hurry, only the first 245 correct solutions will be entered into *Battlestar* proper.

The *Battlestar* entry form will be repeated in the January 20/27 issues of *Popular Computing Weekly*.

Entries for the *Battlestar* competition will close on January 31. The solution to the preliminary competition will be published on February 3.

Popular Computing Weekly Battlestar

To enter *Battlestar*, all you have to do is answer the five questions below, fill in your name, address and telephone number, and send the form with a SAE to: *Battlestar*, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2.

Rules

- Each entry must be made on a form cut from *Popular Computing Weekly*.
- Only one entry per person.
- Closing date for entries is January 31.
- The Judges' decision is final.
- No employees of Sunshine Publications Ltd, or their families, will be eligible to enter *Battlestar*.

Questions

- Which actor played Han Solo in *Star Wars* and Deckard in *Blade Runner*?
- Which film is the sequel to *Star Wars*?
- What do the letters MCP stand for in the film *Tron*?
- What are the names of the two robots in *Star Wars*?
- Where is *ET* trying to phone?

Name

Address

.....

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.....

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Answers

-
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Ziggurat



ET come home

To lose one event is unfortunate, but to lose two events is rather careless, as Lady Bracknell might have said.

The first event to be lost was IT'82 (Information Technology Year 1982). While some of you will have been aware of IT'82, the majority will have been untouched by its existence.

A recent Mori poll (November 1982) has discovered that of the 2,000 people interviewed, 37 percent had never heard of information technology. A further 40 percent knew almost nothing and only 23 percent said they had more than the faintest idea of what information technology meant.

The second lost event, and the indicator of carelessness, was the IT'82 Conference. Held on December 8-9, it hardly made the non-compiling press (despite being honoured by the presence of Margaret Thatcher, who gave the keynote address). The Conference seemed (to one who attended) to be a very self-congratulatory affair, with only token dissent — from those of us sick of jokes about the failures of technology, whenever the gadgetry failed.

Personally, I was fed up with being told that people who were wary of information technology were like those who had wanted to have a man with a red flag in front of early cars.

As the keynote speech, the Prime Minister's address, although beautifully delivered by use of an auto-cue, was full of conventional platitudes. And I noticed in a type-script of her presentation that computer 'program' was spelt

'programme' — a little mistake, but one which indicates that the Prime Minister and her script writers are not truly aware of the subject.

According to Margaret Thatcher, information technology is friendly, and offers a helping hand. "We should think of it more like ET than IT," she said. ET went and left us.

It was a lub-thumping speech. We were reminded of the 62 Nobel Prizewinners in Science who were British, and we were told that we did not proclaim our successes loud enough. The 62 prizewinners were remembered at many times in the succeeding debates, usually to the effect "So what? Does it mean anything?" Kenneth Baker (Minister for Information Technology) in his concluding speech went outside his prepared script to ask "What is the use of Nobel Prizewinners if they do not go into the market place?"

The lub was given another thump for Clive Sinclair, whose profits have jumped astronomically. Margaret Thatcher asked for applause for his efforts, because we should preach the success Britain can achieve and "we are all British." My two neighbours (both of whom were Dutch) did not agree. The Prime Minister then realised that on the platform with her was Etienne Davignon, vice-president of the European Commission. M Davignon is Belgian.

One of the "big" news items at the conference was the cabling of Britain, something which was seen by some interested parties as a means of producing fortunes and jobs. Margaret Thatcher noted that cable was being resisted in some quarters, but (she said) the same arguments were put forward about ITV, 23 years ago. "They were wrong then and they'll be wrong again," we heard. Interestingly, ITV is being watched less now than at any time in the last 25 years.

Remember how we were all being encouraged to build skate-board parks? Some of us said they would be a waste of time, and we were right then...

Mori told us that in 1981 86 percent of those polled knew about micro-electronics. This year it was 62 percent...

Boris Allan

Puzzle

There and back again

Puzzle No 36

A palindrome is a word or sentence that reads the same forwards as backwards. "MADAM I'M ADAM" is probably the best known example.

The world of numbers also has its palindromes. For example, the number 121 is palindromic. It is also a perfect square. Another number that is both palindromic and a perfect square is 484, the square of 22. However, both these numbers have an odd number of digits. Can you discover the lowest palindromic square that has an even number of digits?

Solution to Puzzle No 33

The next three numbers above 50 which can be expressed as the sum of two squares in two different ways are:

$$65 = 1^2 + 8^2 = 4^2 + 7^2;$$

$$85 = 2^2 + 9^2 = 6^2 + 7^2; \text{ and}$$

$$125 = 10^2 + 5^2 = 5^2 + 10^2$$

In the program the value N is tested by subtracting from it all smaller squares. The remainder is then tested to see if it is a perfect square. If this is the case, a further check is made to find whether there is a second set of squares.

```
10 LET C = 0.25 LET N = 10.30 FOR A = 1 TO INT
(SQR(N/2)) + 0.5 40 LET M = (A * A) 60 LET M
= SQM 80 LET M = VAL STR$ M 70 IF M - INT M
< 0 THEN GOTO 170 85 FOR B = A + 1 TO
INT(SQR(N/2)) + 0.5 90 LET P = N - (B * B)
100 LET P = SQR P 110 LET P = VAL STR$ P
120 IF P - INT P < 0 THEN GOTO 160
130 PRINT A;"SQ. = ";M;"SQ. = ";B;"SQ. + ";P;
"SQ. = ";N 140 LET C = C + 1 150 IF C = 4 THEN
STOP 160 NEXT B 170 NEXT A 180 LET N = N +
1 190 GOTO 30.
```

Winner of Puzzle No 33

The winner is: B Beesley, Greens Close, Bishopstoke, Eastleigh, Hants, who receives £10.

Top 10

Atari	2600
1(1) Preppie (Adventure International)	1(1) Black Crystal (Carnell Software)
2(2) Sea Dragon (Adventure International)	2(8) Gauntlet (Colormatic)
3(3) Air Sinks (English Software)	3(2) 3D Defender (JK Greye)
4(5) Submarine Commander (Thorn EMI)	4(5) Gulp II (Campbell Systems)
5(4) Astro Chase (First Star Software)	5(5) Adventure I (Abbersoft)
6(1) Temple of Aposhi (Epyx)	6(1) Espionage Island (Aric)
7(1) Stratos (Adventure International)	7(7) Flight Simulation (Pison)
8(5) Snooker and Billiards (Thorn EMI)	8(9) 3D Monster Maze (JK Greye)
9(1) Alien Swamp (Inhouse Software)	9(1) Frogger (DUL Software)
10(1) Ghost Hunter (Arcade Plus)	10(1) Arcade Pack (C-Tech)

*Cartridge, †32K cassettes.

(Figures compiled by Celsio Computers Birmingham 021-632 6458)

Spectrum	Vic20
1(1) The Hobbit (Melbourne House)	1(1) Traxx (Liamasoft)
2(1) Penetrator (Melbourne House)	2(3) Jellymonsters (Commodore)
3(4) Orbiter (Siversoft)	3(4) Orelinda (Liamasoft)
4(1) Black Crystal (Carnell Software)	4(2) Sirpion II Chess (Commodore)
5(1) Time Gate (Quicksilver)	5(5) Grid Runner (Liamasoft)
6(1) Mazeman (Abbersoft)	6(8) Blitz (Commodore)
7(3) Escape (New Generation)	7(5) Abductor (Liamasoft)
8(1) Football Manager (Addictive Games)	8(7) Myriad (Rector)
9(9) Night File (Hewson)	9(1) Pirates Cove (Commodore)
10(7) Master File (Campbell Systems)	10(9) Adventureland (Commodore)

*Requires 48K.

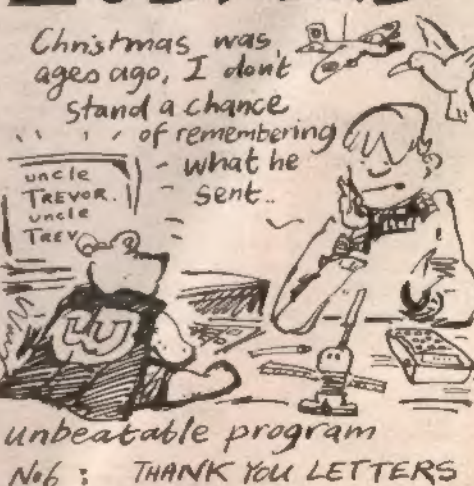
(Figures supplied by Buffer Micro Shop, London 01-769 2887)

Books
1(7) 35 Programs for the Dragon 32, Langdell
2(1) Spectrum Book of Games, James et al.
3(1) Spectrum Machine Language for the Absolute Beginner, Tang
4(6) Programming the 6502, Zaks
5(4) Over the Spectrum, various authors
6(1) Vic20 Programmer's Reference Guide, Fintel
7(3) Assembly Language Programming for the BBC Micro, Birnbaum
8(1) ZX Spectrum, Sinclair
9(1) Discover Forth, Hogan
10(1) 30-hour Basic, Prologue

(Figures compiled by Watford Technical Books, Watford, 0923 23324)

(Last week's position in brackets)

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